An Investigation into the Managerial Motivations for Varying Health and Safety Management Practices: Case Studies and Analyses of Fire Departments in Germany, the Netherlands and Sweden

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Abstract

The aim of this study was to identify how top managers' health and safety (H&S) management practices are affected by their motivations. The research focused on the top organisational level because, under the European framework of enforced self-regulation, it is those managers who are responsible for appropriate H&S conditions in workplaces. The study's results should help to better understand managers' decision making, supporting H&S authorities and other stakeholders in promoting safety at work.

Managerial systems and underlying H&S motivations were investigated based on 24 semi-structured interviews with top-management representatives of medium-sized organisations. The sample comprised four professional fire departments in each of the selected countries: Germany, the Netherlands and Sweden. Relying on a pragmatic research paradigm, the interview data and related organisational documents were used to develop cross-sectional case studies. These were subject to inductive within-case and cross-case analyses, including the development of three country cases.

The findings have been aggregated into a typology of managers' H&S motivations in their managerial and regulatory context. A distinction is made between two types of decision makers: Law Managers and Law & People Managers. The first type reacts to the power of formal rules only, striving to implement legally required H&S procedures. The second type additionally exhibits moral and personal motivations. These moral views result in more effective approaches to H&S management. In contradiction with legal requirements, Law & People Managers often use focused change projects to improve H&S conditions, which was exemplified at organisations in all three countries.

The study contributes to the scientific and practical discourse by adding a new managerial perspective on H&S. This can improve communication between managers and authorities, allowing organisations to apply this study's empirically tested model of effective project-based H&S management. It is recommended that regulations and corporate training aim at sensitising top managers to the moral aspects of H&S.

Keywords: health and safety management, managerial motivations, regulation, change management, qualitative case studies, fire departments

„Man könnte wohl sagen, daß die lebendige Menschlichkeit eines Menschen
in dem Maße abnimmt, in dem er auf das Denken verzichtet...“

[*“To be sure, the very humanity of man*
loses its vitality to the extent that he abstains from thinking…”]

Hannah Arendt,
Lessing-Preis, Hamburg, 1959
(English translation in Arendt, H., 1968, *Men in Dark Times*, Harvest, New York, p. 11)

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I admire my wife, Inge, for being so patient while I constantly searched for H&S information on the internet, not only when at my desk, but virtually anytime with my smartphone. She has been describing me as someone who is always pondering. Thank you also to my parents and grandparents, who supported me during my first two master's programs, laying the foundation for my comprehensive academic interest.

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Finally, I want to mention all those people who saw me on the DB Regio commuter trains, where I wrote large parts of this thesis. Unlike more prominent authors, I had no desk with a view of Lake Como, the Ngong Hills or the North Sea. Instead, I got used to writing in public, inspired by bustling travelers and passing landscapes.

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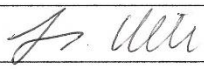
Signature of Candidate:		Date:	29 September 2019

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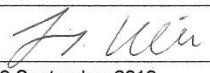
Signature of Individual Submitting:	
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Glossary of Key Terms

Approach to health and safety management

A characteristic set of managerial practices that are applied to create workplaces with acceptable health and safety conditions (EU-OSHA, 2012a; Hale *et al.*, 2012)

Behaviour orientation of health and safety management systems

All health and safety management practices aimed at informal behaviours, as well as the associated social control (Guldenmund, 2010; Krzywicki and Keesey, 2011)

Co-determination

An approach to health and safety management that, according to the findings of this study, is governance oriented and lacks top-management leadership (section 7.2.2)

Co-operation

An approach to health and safety management that, according to the findings of this study, is behaviour oriented and lacks employee innovation (section 7.2.3)

Domination

An approach to health and safety management that, according to the findings of this study, relies on the authority of top management and lacks employee innovation (section 7.2.4)

Elements of an effective health and safety management system

Four specific health and safety practices of top management and employees that together create an optimal safety climate (Vinodkumar and Bhasi, 2010), described in this study's model as 'deciding', 'innovating', 'leading' and 'taking care' (Figure 2.7)

Employees

Organisational members who act within the defined health and safety management system, including supervisors who execute the practical elements of safety climate (Yorio *et al.*, 2015; Zohar and Luria, 2005)

Enforced self-regulation

A regulatory approach that allows organisations to develop, within a prescribed framework, individual rules that are enforced by authorities mainly through dialogue rather than sanctions (Braithwaite, 2011; Johnstone, 2014)

Enforcement pyramid

A concept of responsive regulation according to which managers' compliance is stimulated by a combination of support and deterrence; generally applied in enforced self-regulation (Braithwaite, 2011)

Focusing

An approach to health and safety management that, according to the findings of this study, typically covers all elements of an effective health and safety management system; often applied in the context of change projects (section 7.2.1)

Formalistic organisation

The context in which the health and safety behaviour of an organisation's members is generally characterised by regular analyses and scheduled meetings as described as a finding of this study in section 7.1

Good moral judgment

A concept of ethical decision-making according to which managers' compliance is stimulated by supporting and sensitising discussions (Heyler *et al.*, 2016; Nielsen, 1984)

Governance orientation of health and safety management systems

All health and safety management practices aimed at formally documented structures and processes as well as associated rule compliance (Griffin and Hu, 2013; Guldenmund, 2010)

Health and safety condition

The state of the workplace with regard to the risk to employees of becoming ill or suffering an accident, and the availability of related information (Hale *et al.*, 2010; Reason, 1998)

Health and safety management practices

Management activities that are intended to create workplaces with acceptable health and safety conditions (EU-OSHA, 2012a; Hale *et al.*, 2012)

Health and safety management system

All health and safety management practices in a specific context, defined by formally documented structures and processes, as well as informal behaviours related to health and safety goals and policies (Guldenmund, 2010; Hale *et al.*, 2012; Yorio *et al.*, 2015; Zohar and Luria, 2005)

Health and safety management system model

Description of a specific way of implementing a health and safety management system with reference to the four elements 'deciding', 'innovating', 'leading' and 'taking care' (Figure 2.7) that were derived from Vinodkumar and Bhasi (2010)

Law Manager

A type of managerial motivation that is related to top managers directly responding to regulatory promotion according to the enforcement pyramid (Braithwaite, 2011), reflecting a strong motivation from the 'power of formal rules' as identified in section 8.3

Law & People Manager

A type of managerial motivation that is related to top managers trying to combine legal compliance and feelings of moral responsibility (Hawkins, 2002), reflecting a co-existence of 'power of formal rules' and 'moral and personal' motivations as identified in section 8.3

Managerial context

Characteristics of health and safety issues in their organisational environment, which top management addresses with specific ways of implementing a health and safety management system (Bluff, 2011)

Motivation

A factor that drives people's activities (Bluff, 2011; EU-OSHA, 2010); the motivational drivers for H&S management are categorised in this study as 'limited resources and savings', 'overall performance and safety', 'power of formal rules', 'moral and personal', and 'power of informal rules' (section 9.1)

Organisational context

Characteristics of an organisation's internal environment; they may be categorised as ongoing operations, change projects or high-level decisions (Capon, 2004)

Pragmatic organisation

The context in which the health and safety behaviour of an organisation's members is generally characterised by pragmatic views and spontaneous meetings as described as a finding of this study in section 7.1

Regulatory context / regulatory environment

The characteristics of the regulator's activities that top management responds to with specific ways of implementing health and safety management systems (Hale *et al.*, 2015)

Safety climate

Employees' perceptions of formal and informal rules, as well as their preferences regarding the health and safety conditions; typically measured with quantitative employee surveys (Guldenmund, 2010; Zohar, 2010)

Safety culture

The values and beliefs of an organisation's members regarding the health and safety conditions and related activities; typically revealed by long-term expert judgement (Guldenmund, 2010; Hale *et al.*, 2010)

Top management

The highest-ranking managers and the H&S specialists who advise them; together they decide on an organisation's health and safety management (Hale *et al.*, 2010; Yorio *et al.*, 2015)

Typology of managers' health and safety motivations

A grouping and characterisation of managers based on their dominant motivations for engaging in health and safety management, reflecting managers' views on the issue (Bazeley, 2013)

Way of implementing a health and safety management system

The manner in which top managers facilitate the execution of organisational health and safety goals, policies, procedures and measures (Zohar and Luria, 2005)

List of Abbreviations

DE	Germany
D-1 to D-5	Fire departments numbers one to five in Germany (including D-1 as participant in the second pilot study)
EU	European Union
EU-OSHA	European Agency for Safety and Health at Work, Bilbao, Spain
HSE	Health and Safety Executive, a non-departmental public body in the United Kingdom
HSMS	Health and safety management system
H&S	Health and safety
IOSH	Institution of Occupational Safety and Health (IOSH), Wigston, United Kingdom
ISO	International Organization for Standardization, Geneva, Switzerland
NL	The Netherlands
NL-1 to NL-5	Fire departments numbers one to five in the Netherlands (including NL-1 as participant in the first pilot study)
OHS	Occupational health and safety
OHSAS 18001	Occupational Health and Safety Assessment Series 18001, an internationally applied British standard for HSMS
OSH	Occupational safety and health
QDA	Qualitative data analysis
SE	Sweden
S-1 to S-5	Fire departments numbers one to five in Sweden (including S-1 as participant excluded from the analysis)
UK	United Kingdom

Chapter 1
Introduction and Context of the Research

1.1 Rationale for research

Modern health and safety (H&S) management is a complex task for managers. Not only does it require compliance with the relevant laws, regulations and guidelines, it also requires that managers develop their own organisational structures and practices to ensure good H&S conditions for their employees (EU-OSHA, 2012c). This idea is reflected in the EU Framework Directive 89/391/EEC on Safety and Health at Work, which provides a framework of enforced self-regulation across Europe (Ales, 2013). Under enforced self-regulation, authorities define broad regulatory goals that managers are expected to meet by developing their own H&S measures (Fairman and Yapp, 2005a). Apart from basic rules for H&S management processes, only a few operational H&S measures are defined as mandatory minimum requirements (Hale *et al.*, 2015). Authorities focus on providing compliance support rather than on enforcement through sanctions (Braithwaite, 2011).

Hutter (2001) described the health and safety management system (HSMS) of British Railways as having been implemented under enforced self-regulation in the UK in the late 1980s and early 1990s. Based on 135 qualitative interviews at the company, she investigated the organisational H&S conditions under this regulatory approach, which was adopted in the UK in 1974. She found that the HSMS of British Railways was not effective despite the company's high H&S motivation and its compliance with legal requirements. Hutter (2001, p. 393) stated:

> *"British Railways provided safety equipment and safety clothing but these were not always used. It had in place rules and systems for health and safety but these were not always enforced. It also provided health and safety education, but the risks were not always understood by its staff."*

Hutter (2001) attributed the shortcomings of the HSMS at British Railways to complex corporate H&S rules, a fragmented company structure and a heterogeneous corporate

culture. She concluded that the company was not able to create good H&S conditions. But why should an organisation not be able to overcome such problems? In contrast to Hutter (2001), this study assumes that a company's ability to implement an effective HSMS is determined by top management. The initiative of top managers and the H&S specialists advising them has been described as essential to promote good H&S conditions in organisations (Hale *et al.*, 2010).

To reveal why top managers implement HSMSs of varying effectiveness, this study investigated the relationship between managerial motivations and management practices. Top management comprised the decisions makers who defined the working environment of their employees by allocating resources, implementing organisational processes and assuming leadership roles (Hale *et al.*, 2010). There is broad literature on the ways in which they might create a good safety culture, a good safety climate and, ultimately, good working conditions for their employees (Yorio *et al.*, 2015). In Chapter 2 the literature on H&S management is reviewed and a model of an effective HSMS is developed, forming the basis for data collection and analysis.

Few studies have been conducted on managers' motivations for implementing HSMSs in certain ways (Frick and Johanson, 2013; MacEachen *et al.*, 2016). Previous research mostly took an inspectors' perspective by evaluating formal compliance (Fairman and Yapp, 2005a) or investigating the application of H&S management tools that authorities provided (Beck, 2011). For example, a strong motivation for legal compliance might explain why, according to Hutter (2001), British Railways complied with the legally required rules and procedures but paid little attention to the outcomes of their HSMS. The dominating perspective of inspectors might be considered the cause for the lack of research on managers' activities and motivations. This study addressed this literature gap by investigating the views and experiences of top managers and the H&S specialists advising them. Surveys indicated that about three-quarters of managers considered H&S issues to be important (Beck, 2011; KPMG, 2001; Njå and Fjelltun, 2010). Such individuals with a generally positive view on H&S management were expected to participate in the semi-structured interviews of this study. The aim was to identify how top managers' ways of implementing an HSMS are affected by their H&S motivations.

1.2 Scientific background

The general objective of an HSMS is to ensure that the members of an organisation act in a common and coordinated way to reduce their individual H&S risks. EU-OSHA (2012a, p. 8) summarised:

> *"Prevention is the cornerstone of the European approach to occupational safety and health. In practice, this means analysing work processes to identify short- and long-term risks, and then taking action to either avoid them as far as possible or mitigate them."*

EU-OSHA (2012a) emphasised that top managers are obligated to define decision-making processes for determining the extent to which risks can be avoided or which risks will be accepted. They hold the ultimate responsibility for the actual H&S conditions.

The task of creating a healthy and safe workplace is difficult because risk determinants in employees' physical and organisational working environment are often complex and ambiguous in nature (Reason, 2016). Even comprehensive technical, organisational or psychological analyses do not provide definitive results. Therefore, managers have to decide on the basis of incomplete information (Hale *et al.*, 2012). They may use empirical studies by external research institutions, or they may follow the advice of regulatory authorities. However, according to European H&S laws, managers are ultimately responsible for the well-being of their employees (EU-OSHA, 2012a). They act under considerable legal uncertainty because legal prosecution typically takes place only in the case of severe accidents (Gunningham, 1998; Gregor, 2006; Johnstone, 2014). This uncertainty and the incomplete information on H&S risks result in complex conditions for decision makers.

An organisation's HSMS comprises all strategic H&S practices designed to create appropriate H&S conditions (Yorio *et al.*, 2015). Both formal organisational rules, such as certified risk assessment procedures, and informally developed behaviours, such as common work practices, must be considered (Hale *et al.*, 2012). The literature review in Chapter 2 suggests that an effective HSMS has two prerequisites. First, the

engagement of top management and employees should be balanced, because neither managers nor workers can create good H&S conditions alone (EU-OSHA, 2012a). Second, the HSMS should consider both rule-based governance and initiative-based behaviour. The focus on rule compliance is necessary to ensure basic safety practices (Griffin and Hu, 2013). Supporting employee initiatives through a positive safety climate promotes the development of good H&S measures (Denti, 2013).

A modern, proactive approach to H&S management has evolved since the 1970s (Reason, 2016). The central definition of H&S measures is replaced by the application of management systems that enable bottom-up H&S innovations (Drais *et al.,* 2008; Hale *et al.,* 2012). H&S rules and measures are developed close to the workplace, using regular formal risk assessments based on the latest information from internal and external sources (Reason, 2000). Management provides the leadership and organisational structures for the development and implementation of good H&S conditions. In order to work, the HSMS must be driven by the *"twin motors of top management and the safety professional"* (Hale *et al.*, 2010, p. 1034). This approach corresponds to the European regulatory framework mentioned above (EU-OSHA, 2012a). Such systems provide a framework for all H&S-related activities within an organisation and should foster the creation of a safety culture, which, in turn, supports the optimisation of the H&S conditions (Guldenmund, 2010).

H&S regulation in Europe has developed in parallel with the modernisation of management approaches (Reason, 2016). In the past, H&S authorities used to define comprehensive and detailed rules for many different types of workplaces. Today they focus on supporting organisations in implementing modern HSMSs. Thus, the regulatory approach moved away from command and control toward enforced self-regulation (Fairman and Yapp, 2005a). This development began in Scandinavia and the United Kingdom in the 1970s (Walters and Wadsworth, 2014) and was then transferred to the other member states of the European Union in the 1990s (Ales, 2013). Due to historical and socio-political influences, variations between these two main approaches still exist within the EU (Walters and Wadsworth, 2014). Ales (2013, p. 449) explained that the *"procedural part of health and safety law"* was harmonised by EU Framework Directive 89/391/EEC on Safety and Health at Work while *"the substantive part of it"*, comprising quality targets, organisational procedures and legal penalties, remained national.

Baldock *et al.* (2006) and Beck (2011) stated the following prerequisites for good H&S conditions based on independent research in Germany and the United Kingdom:

- Management commitment, including awareness, capability and a proactive approach
- Cooperative work culture
- Availability of information and propensity to utilise it
- External factors, including inspections and stakeholder demands

The first aspect reflects the responsible managers' general knowledge and views on H&S risks and related measures. The second aspect refers to the interaction between managers and their employees. These two prerequisites determine the organisational framework for a modern approach to H&S management as described by EU-OSHA (2012a). The availability and usage of information influences the contents of the discussion and thus the achievable quality of the H&S conditions (Reason, 1998). Finally, the external factors influence top managers' decisions on H&S measures and budgets, balancing the competing forces of production and safety (Reason, 2016).

Top managers' decision-making is mainly based on legal, economic and social-context motivations (Bluff, 2011). Authorities may address these motivations in order to change H&S management practices. Previous studies on managers' H&S motivations and practices took a rather general perspective (Bluff, 2011; Frick and Johanson, 2013). They investigated the preferences of managers but did not consider why or how managers implemented HSMSs in their organisations. Fairman and Yapp (2005a), as well as Hale *et al.* (2015), stated that managers of small enterprises preferred clear rules from authorities to general management guidelines, because they did not have the resources to develop their own H&S measures. In contrast, larger organisations preferred the freedom of the modern H&S management approach and often exceeded legal requirements because they wanted to mitigate reputational risks (Hale *et al.*, 2015; Gunningham *et al.*, 2005). Research to date has not focused on management activities but on the relationship between regulation and rule compliance (Gunningham *et al.*, 2005; Hale *et al.*, 2015; Scholz and Gray, 1990; Walters *et al.*, 2011) or regulation and safety outcomes (Hale *et al.*, 2010; Lindøe *et al.*, 2006). How top managers' decisions on HSMS are affected by their H&S motivations has been investigated by only a limited number of case studies that are mostly confined to individual countries, such as Beck

(2011) in Germany, Zwetsloot *et al.* (2011) in the Netherlands and Frick (2013a) in Sweden.

1.3 Why fire departments in Germany, the Netherlands and Sweden?

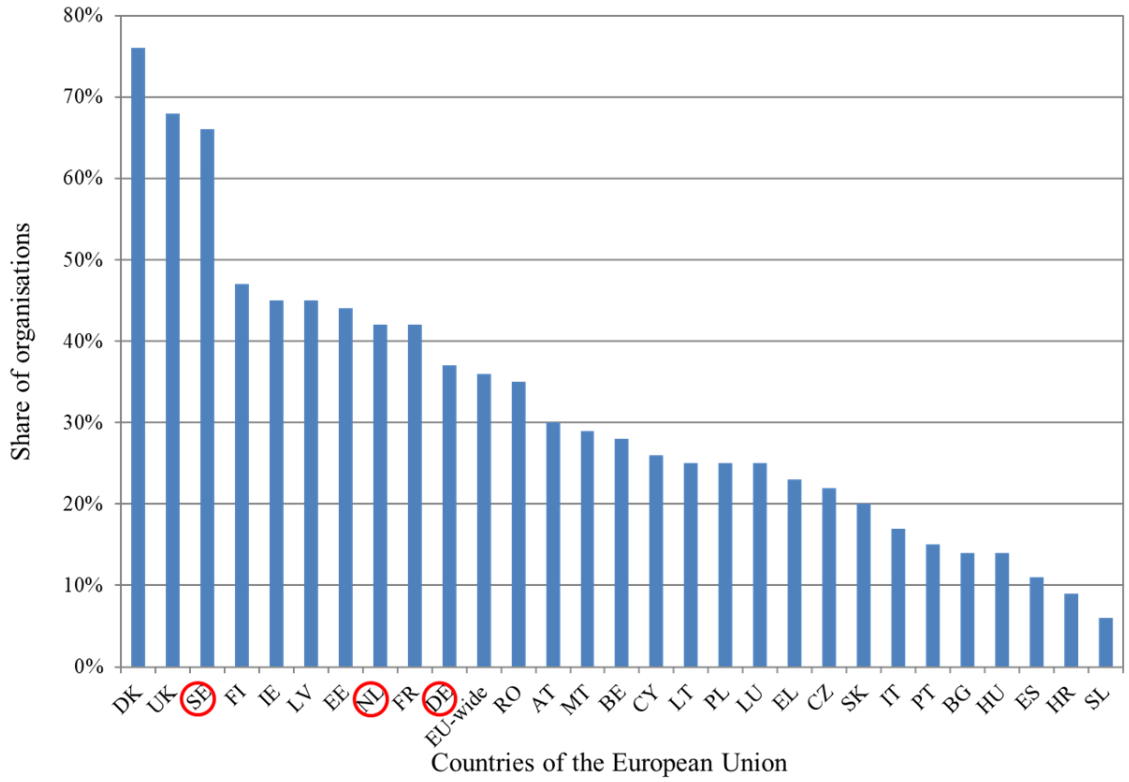
Cases from professional fire departments were expected to provide good examples for H&S management because H&S awareness is generally high due to the relatively dangerous work environment (Alavaara, 2007; Reason, 1998). In the selected countries, fire departments are municipal organisations that are free in decision making, especially in terms of H&S. They report to the cities' mayors but are independent from the rest of the public administrations due to their distinct area of work. The commanders of the brigades and the H&S specialists advising them were therefore interviewed as representatives of top management. Additionally, organisational H&S documents were reviewed to investigate the individual ways of implementing an HSMS. These seemed to be relatively diverse in fire departments because, during emergency situations, firefighters are typically exposed to a combination of many different occupational risks, while in between emergencies, they face the general risks of office and maintenance work (EU-OSHA, 2011; Gerhold, 2012). Medium-sized fire departments were chosen in order to investigate management decisions at the intersection of large organisations, which prefer the freedom of modern self-regulation, and small organisations, which like clear rules from H&S authorities (section 1.2). In the three countries selected, fire departments are local organisations under the control of municipalities.

Different countries were considered because varying regulatory environments were expected to have differing influences on managers. Due to historical and socio-political influences, the regulatory environments and management practices differ between Germany, the Netherlands and Sweden (Walters and Wadsworth, 2014). The Europe-wide quantitative survey 'Esener-2' of the European Agency for Safety and Health at Work in Bilbao, Spain (EU-OSHA, 2015) confirms this. The European approach to H&S management is based on the assumption that *"those controlling the work are in the best position to control the risks"* (EU-OSHA, 2015, p. 6). Thus, an organisation that pursues the desired approach should conduct its workplace risk assessments with its own staff. The national differences shown in Figure 1.1 suggest that the modern approach to H&S management is applied to varying extents. Indeed, Sweden may be

considered a leading country, while Germany and the Netherlands are followers (Walters and Wadsworth, 2014). Germany and the Netherlands differ in terms of top-management attention to H&S (Walz and de Ruig, 2011).

Figure 1.1

Workplace risk assessments by internal staff (EU-OSHA, 2015)



Before deciding to take fire departments as an example, the literature was investigated to determine whether there are fundamental differences between public and private organisations with regard to H&S management. No direct answer to this question was found. However, the study by Bysted and Hansen (2015) provided relevant information because the European approach to H&S management represents a kind of innovation management (Drais *et al.*, 2008; Hale *et al.*, 2012). Bysted and Hansen (2015) concluded that innovative behaviour does not differ between public and private organisations, but rather between different subsectors in the public and private domain. Both public and private organisations were more or less innovative. Accordingly, it could be assumed that both public and private organisations had a competent HSMS. Thus, fire departments were considered a suitable example for investigating H&S management in general.

1.4 Research question, aim and objectives

To address the identified gap in the literature on H&S management, the relationship between managers' H&S motivations and their ways of implementing an HSMS was investigated. This managerial-behaviour perspective was considered important because top management decides on the characteristics of the organisational HSMS and thus the H&S conditions for employees. Therefore, top managers and the H&S experts advising them were asked about their views and experiences. The answers from the semi-structured interviews were codified for analysis. By comparing and contrasting the codes in different regulatory environments, relationships were identified and an empirically based typology of managers' H&S motivations was developed. This research approach is reflected in the following research question, aim and objectives.

Research question:

> How are top managers' ways of implementing an HSMS affected by their H&S motivations in different regulatory environments?

Research aim:

> To identify how top managers' ways of implementing an HSMS are affected by their H&S motivations in different regulatory environments.

Research objectives:

- To codify top managers' ways of implementing an organisational HSMS.
- To codify top managers' perceptions of H&S authorities' regulatory approaches.
- To codify the H&S motivations of top managers.
- To identify relationships between managers' ways of implementing an HSMS and their H&S motivations in different regulatory environments.
- To develop a typology of managers' H&S motivations in their managerial and regulatory context.

1.5 Expected contributions

The main result of this study was expected to be an empirically based typology of managers' H&S motivations in their managerial and regulatory context. This outcome should illustrate how top managers' decisions regarding HSMSs are affected by their H&S motivations. The study adds an otherwise absent managerial-behaviour perspective to the predominant inspectors' view in the current literature. The case studies provide examples of current managerial practices that may be applied across fire brigades and countries. Additionally, the cross-case analysis of three countries illuminates the effects of different national regulatory environments. Therefore, the envisaged results are relevant to managers and H&S authorities alike. The typology of managers' H&S motivations was expected to indicate which H&S motivations should be addressed to promote effective HSMSs in organisations. It should enable H&S authorities and other stakeholders, such as trade union representatives and non-executive directors, to improve their measures for promoting health and safety at work. Finally, an analytical tool for reviewing organisational HSMSs was to be tested and refined in order to provide a reference point for effective H&S management.

1.6 Outline of the thesis

This thesis comprises 12 chapters. The first five chapters describe the scientific and practical foundations of the study. Chapter 1 presents the context of the research and Chapter 2 comprises a comprehensive literature review. The research question and aim as stated in section 1.4 address the identified gap in the literature on H&S management. The related objectives are explained in Chapter 2, where a model of the elements of an effective HSMS is derived, and enforced self-regulation is explained as the European approach towards H&S regulation. The literature on managers' H&S motivations and decision-making is reviewed. Subsequently, the research methodology and design are developed in Chapters 3 and 4. A qualitative methodology within a pragmatic paradigm is justified using case studies to investigate the complex social phenomenon of managers' H&S motivations and their decisions regarding HSMS implementation. Qualitative semi-structured interviews are the primary data source, as is common in management research (Piekkari *et al.*, 2009). The interviews were designed based on

conversations with representatives of Dutch, German and Swedish fire services. Subsequently, two pilot case studies were conducted, as presented in Chapter 5.

The last seven chapters of this thesis present the data collection and analyses, which were carried out according to the approach of Eisenhardt (1989). Individual case studies are described in Chapter 6 with a view to the theoretical framework from the literature. There are 30 examples of organisational HSMS implementations from 24 interviews at 12 fire departments. Categories of organisational and regulatory contexts are defined in Chapter 7 based on cross-case analyses, and the envisaged typology of managers' H&S motivations is developed in Chapter 8. Subsequently, conclusions are discussed in view of the literature (Chapter 9). The identified relationships between managers' H&S motivations and their ways of implementing HSMSs and their regulatory experiences are compared with findings of other studies. The expected contributions to the knowledge base, stated in section 1.5, were achieved as outlined in Chapter 10. Additionally, focused change projects are presented as a newly identified approach to H&S management that might amend or replace common ways of implementing an HSMS. The thesis ends with reasons for and against generalisation and recommendations for future research in Chapter 11, and personal reflections on what I learned during this study in Chapter 12.

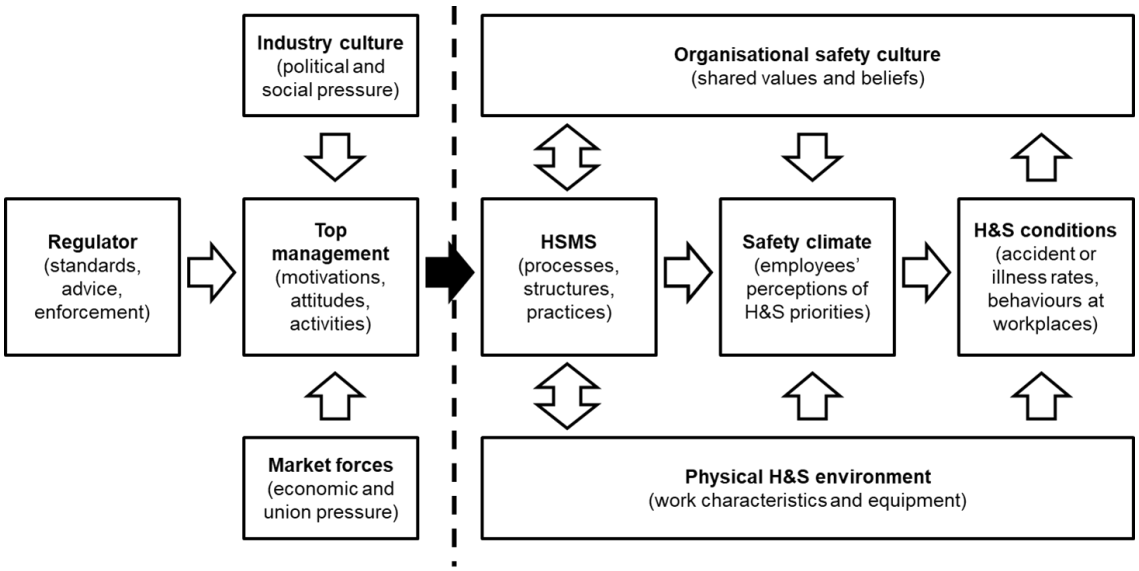
Chapter 2
Literature Review

2.1 Conceptual framework of H&S management

There is a diverse literature base on HSMSs and their effects on the organisational safety culture, the safety climate, the physical H&S environment and the resulting H&S conditions. Based on a model presented by Yorio *et al.* (2015), Figure 2.1 was developed to provide a structural overview for this literature review. The main additions to the original model relate to regulatory and industrial influences on top managers (Bluff, 2012), the effects of the physical environment (Makin & Winder, 2008; Reason, 1998) and the overarching concept of safety culture (Guldenmund, 2010; Reason, 1998; Reason, 2016). The resulting framework comprises all major aspects of organisational H&S and its determinants.

Figure 2.1

Conceptual framework of organisational H&S and its determinants



The H&S characteristics of an organisation are shown on the right side of Figure 2.1. Top management, comprising senior managers that are typically supported by H&S experts, forms these H&S characteristics by deciding on the organisational HSMS. As shown on the left side of Figure 2.1, management decisions are influenced by industry culture, market forces and the H&S regulator. The resulting HSMS may be formally defined or informally practised within the organisation. It affects the safety climate and,

with it, employees' safety behaviour as well as accident and illness rates. The HSMS also determines the safety culture and physical working environment. These two aspects represent the long-term, comparatively stable background of the organisation, being formed by previous resource allocations (for example to machinery) and previous H&S conditions (including major accidents). The safety climate at the workplace develops on the basis of the implemented HSMS and the organisational safety culture as well as physical working environment. The ultimate objective of all such management activities is to create good H&S conditions.

With reference to Figure 2.1, this literature review distinguishes between three distinct streams of literature on organisations' H&S characteristics. These streams offer managers guidance from different perspectives:

- The first perspective is safety culture as a comprehensive concept that takes into account both the effects of human behaviour on organisational safety and the historic focus on technology and working rules. This literature is predominantly qualitative in nature and gives managers rather general recommendations.

- The second is safety climate as a concept for measuring an organisation's current H&S conditions. These authors use quantitative employee surveys to identify the main drivers of H&S conditions.

- The third perspective is that of practical HSMS guidelines that build on the above topics and that, to some extent, reflect legal norms. These texts describe how to implement an HSMS in an organisation.

The literature review first considers these three streams of literature to identify how managers should act to create appropriate working conditions. The subsequent part of Chapter 2 then covers the literature on regulation and its effects on H&S management in organisations. Finally, the literature on the role and motivations of top managers in the field of H&S is reviewed. As mentioned by Bluff (2011) and MacEachen *et al.* (2016), there has been comparatively little research on managers' H&S motivations and related activities. The research question, aim and objectives are justified with reference to the comprehensive literature review.

2.2 Safety culture as an organisational background

Hale *et al.* (2010, p. 1026) defined safety culture as *"beliefs, motivations and choices of workforce (and management)"*. Safety culture provided the *"motivational resources"* and the *"energy and priority which goes into animating"* the HSMS. Just like general organisational culture, safety culture is an overarching characteristic of a group of people that influences all activities and, with it, the overall H&S conditions. To some extent, it is explicitly communicated, but mostly it is tacit in nature and thus difficult to completely describe and understand. It is the result of an organisation's history, its environment and its top-management leadership (Reason, 1998). The term 'safety culture' has been used since the early 1970s and reflects the idea that human factors should be considered in H&S management (Reason, 2016).

Guldenmund (2010) distinguished between three views on safety culture: academic, pragmatic and analytical. The academic approach is mainly used in the scientific context and refers to qualitative ethnographic studies. The basic idea is that an organisation's safety culture develops over time as a result of both internal and external influences. Culture is viewed as something an organisation *"is"* rather than *"has"* (Guldenmund, 2010, p. 1467). According to Guldenmund (2010), there is little literature in this field. Such research might provide rich descriptions of different manifestations of safety culture. These could then be used to further develop the more applied approaches to safety culture, namely, the pragmatic and the analytical view. Only these views are considered in this literature review because the academic view does not provide guidance on practical H&S management.

The pragmatic approach to safety culture focuses on offering managers guidance. Reason (1998, p. 302) stated: *"for all practical purposes, a safe culture could be equated to an informed culture"*. A reporting system is used to collect information about the technological and organisational H&S conditions in order to ensure that every manager and employee has the information required to run the business safely. The reporting system is characterised by proactive reporting by the organisation's members. In line with the academic view and the definition of Hale *et al.* (2010), culture is characterised by the values and opinions of managers and employees. It is analysed in the context of organisational structures and processes in order to derive solutions for businesses (Guldenmund, 2010). Accordingly, the term 'safety culture' comprises the

soft or human elements of HSMSs, for example communication processes. This mainly qualitative approach may also be called the consulting approach to safety culture because it has been widely used by management consultants in recent decades. It might be considered the initial H&S approach from the 1970s for dealing with human factors in the field of H&S management.

As shown in Figure 2.1, safety culture is an overarching concept that is related to all organisational elements of H&S management (Reason, 1998; Guldenmund, 2010). It influences both the HSMS and employee perceptions. In contrast to Yorio *et al.* (2015), the basic assumption of this study is that a strategically implemented HSMS is not defined by top managers and their H&S experts alone, it is also influenced by the organisational values, that is, the safety culture as defined by Hale *et al.* (2010). This assumption relates to the pragmatic approach of Guldenmund (2010), who included the soft elements of the HSMS in his pragmatic definition of safety culture. He emphasised that there was a dynamic interplay between an organisation's safety culture and its formal processes and structures.

If top managers decide to improve H&S conditions, their managerial measures may affect both the physical H&S environment (for example, by investing in safe technology) and the organisational safety culture. The effectiveness of the measures depends on the cultural background of the organisation because human behaviour ultimately determines the degree of achievable safety (Reason, 2016). According to Reason (1998), it is difficult to change employees' opinions by persuasion, but modifying organisational structures and processes may lead to new beliefs. For example, a powerful managerial position might be implemented within an organisation in order to counteract pressures that favour production over safety (Hopkins, 2006). Safety culture is also affected by how the H&S conditions have been experienced, which is characterised by historic accidents and incidents as well as current working conditions (Reason 2000). Thus, changing an organisation's safety culture is an iterative process that takes time (Reason, 1998).

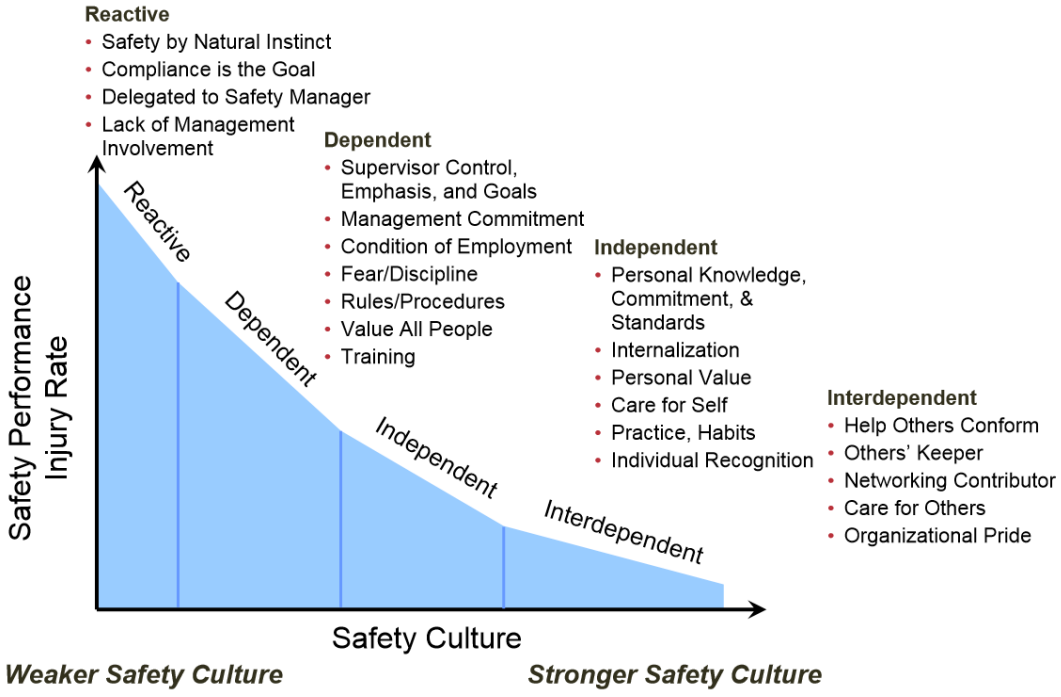
An organisation's physical equipment and working conditions also affect its safety culture. This is shown as an indirect relationship via the HSMS and the safety climate in Figure 2.1. The processes and organisational elements of the HSMS are influenced by the actual jobs that have to be performed. Additionally, workers' physical

environment affects their risk perception. Reason (1998) exemplified this effect by referring to nuclear power plants and building construction sites. In the former, very few incidents occur, so employees may forget to be afraid. At construction sites, in contrast, dangers tend to be evident because situations are obvious and accidents more frequent, resulting in more cautious employees. Risk perceptions are also influenced by information that is widely available within the industry and by national media reports about incidents. In this context, the size of a country matters, as well: because the media is nationally organised, there are more reports about accidents in larger countries (EU-OSHA, 2013). National culture, in contrast, has only a minor influence on risk perceptions (Mearns and Yule, 2009; Sjöberg, 2000).

A commonly known consulting concept of safety culture is the DuPont Bradley Curve, as shown in Figure 2.2. It distinguishes between four phases of organisational culture and indicates the corresponding manifestations in the behaviour of managers and employees. Krzywicki and Keesey (2011, p. 3) put it very succinctly: safety culture *"defines what people do when no one is watching"*. This definition adds an element of social control to the information focus of Reason (1998).

Figure 2.2

DuPont Bradley Curve (Krzywicki and Keesey, 2011, p. 5)



According to the DuPont Bradley Curve, any organisational safety culture has four development phases. The reactive phase represents a weak safety culture. Top management is hardly interested in the issue and relies on the safety instincts of workers. Compliance with H&S laws and regulations is ensured by delegating corresponding tasks to safety engineers, called safety managers in Figure 2.2. These typically focus on documentation, which has little effect on the actual H&S conditions in the organisation (Frick, 2013b).

The dependent phase of safety culture corresponds to the top-down management approach to H&S management. In this environment, top management deals with H&S issues, but focuses extensively on centrally defined rules. Reason (2000) stated that formal rules are problematic, especially when the working conditions are characterised by local variations, such as in firefighting. In such contexts, rules often are not applicable due to the actual situation, or they may even be entirely absent. In organisations with this type of work culture, top managers are committed to ensuring good H&S conditions for their employees, but they over-emphasise rules and top-down decision-making (Reason, 2000). Hale *et al.* (2012, p. 33) stated, with reference to the top-down management approach:

> *"We also approach here the limits of the use of rules, in the sense that proactively made rules can never cover all eventualities, even in relatively simple tasks. At that point the only defence against the unpredictable (or unpredicted) is deep professional competence through experience, training and the sharing of expertise."*

The independent and interdependent phases of the DuPont Bradley Curve refer to the modern approach of HSMSs. In both phases, bottom-up decision-making is supported by good H&S knowledge on the part of employees and comprehensive information flows. Employees' personal commitment and knowledge and their individual recognition allows them to better deal with variations in their working environment. The main difference between the independent and interdependent phase is that, in the former, employees show *"care for self"*, while in the latter, they also show *"care for others"*, sharing information about H&S-related experiences among all employees and managers. In terms of the dangers of its production business, the organisation *"knows*

continually where the 'edge' is without necessarily having to fall over it" (Reason, 2000, p. 3). This organisational knowledge is built by gathering and exchanging information about incidents such as near misses and accidents. It is disseminated throughout the organisation to ensure that both managers and employees know about *"human, technical, organizational and environmental factors that determine the safety of the system"* (Reason, 1998, p. 294). In the final, interdependent phase, the information exchange and proactive activities of managers and employees are at the highest level because H&S is among the organisation's most important values. Conflicts between business and H&S matters tend to be resolved in favour of the latter. Reason (2000, p. 11) concluded:

> *"No organisation is just in the business of being safe. The continuing press of productive demands is far more likely to engage the forefront of people's minds than the possibility of some unlikely combination of protective failures. This is exactly why safety culture is so important. Culture transcends the psychology of any single person. Individuals can easily forget to be afraid. A safe culture, however, can compensate for this by providing the reminders and ways of working that go to create and sustain intelligent wariness."*

A safety culture can be socially engineered (Hudson, 2007; Guldenmund, 2010; Reason, 1998). It is influenced by management activities, both in terms of top managers' visible actions and their decisions regarding organisational structures and processes. According to Reason (2000, p. 12) a safe culture consists of four elements:

- *"reporting culture"*
- *"just culture"*
- *"learning culture"*
- *"flexible culture"*

The *"reporting culture"* is characterised by the willingness of all members of the organisation to report incidents that are relevant to H&S. Such events are often dangerous situations that occur because of individuals' mistakes. In order to motivate

these persons to report their mistakes, a *"just culture"* is needed. The members of the organisation must be able to trust that they can talk about events without getting punished. This requires that it be clear to everybody what kinds of actions are acceptable and what kinds are unacceptable (Reason, 1998). As a result, about 90% of all unsafe actions are more or less non-culpable and can be reported by the acting individual (Reason, 2000). A *"learning culture"* is established by evaluating the collected information and disseminating the results of the analysis within the organisation. Finally, a *"flexible culture"* is needed to allow for unpredicted variations in H&S conditions. Reason (2000, p. 6) mentioned an example from firefighting in the United States where 13 firefighters died in the Mann Gulf forest fire disaster in 1949 because they *"obeyed the organisational instruction to keep their fire-fighting tools with them at all times."* The survivors violated the rule by dropping their heavy tools in order to escape the fire. However, such decentralised decision-making may also create new risks if the limits are not clearly defined. Leveson *et al.* (2009) emphasised that optimal decision-making often requires knowledge of the work processes in the greater organisational context. This is often not given on the work-floor level. Therefore, he called for the alignment of employee education with their decision-making limits. Such limits, however, may contradict the safety culture approach described by Reason (2000).

2.2.1 Summary of safety culture as an organisational background

A positive safety culture is an important objective of modern H&S management. It implies open communication of H&S issues and organisational pride in good H&S conditions. Managers should implement their HSMS in a way that supports the development of corresponding organisational values and beliefs because it has a strong influence on the day-to-day behaviour of their employees (Krzywicki and Keesey, 2011). Organisational processes and structures should promote information exchange in order to ensure that all relevant H&S measures can be taken (Reason, 2000). Empowering and training employees are additional measures. However, it is difficult to measure the success of managers' efforts because there is no clear definition of the concept of safety culture. It is *"grounded in expert judgment and primarily based on observables"* (Guldenmund, 2010, p. 1470), resulting in ambiguous interpretations and unclear recommendations for HSMS implementation.

2.3 Safety climate as a quantitative indicator

Safety climate has been called the analytical approach to safety culture (Guldenmund, 2010). It is defined as employees' shared perception of H&S behaviour within an organisation and may be used to quantitatively measure the development of a safety culture (Zohar, 2010). In line with the pragmatic concept of safety culture, employees are at the centre of the approach. The difference is that, instead of observing workers' behaviour, the safety climate is evaluated by asking employees about their understanding of organisational rules and procedures. The resulting quantitative surveys reveal whether employees have the awareness and motivation to participate in creating safe working conditions. Safety climate may be considered a snapshot of safety culture (Guldenmund, 2010), reflecting the current values and beliefs of an organisation's members. The concept of safety climate has been established as a quantitative indicator of an organisation's H&S conditions since the late 1970s (DeJoy *et al.*, 2004; Zohar, 2010).

The approach of determining the organisational safety climate by investigating employees' shared perceptions has been empirically tested in a large number of studies using many different variables and factors for describing safety climate (Griffin and Neal, 2000; Vinodkumar and Bhasi, 2010; Yule *et al.*, 2007; Zohar, 2010). Safety climate has been shown to be a good predictor of organisational accident rates, although there is no clear agreement regarding its determinants (Zohar, 2010). Corresponding employee surveys investigated a variety of elements that might be relevant for the H&S conditions within an organisation.

Based on the HSE Climate Survey Tool developed by the UK regulator (Health and Safety Executive, HSE), Yule *et al.* (2007) presented their safety climate model, shown in Figure 2.3. In their study, 1,023 employees of a utility company in the United Kingdom answered questions about their perceptions of management's commitment/involvement and management's practices (that is, safety systems, employee training etc.). Also employees' views on individual accountability, responsibility and risk-taking behaviour were considered to be part of the safety climate. The study investigated the statistical relationships between the elements shown in Figure 2.3. Only statistically significant paths are shown (indicated by standardised path coefficients).

Figure 2.3

Safety climate model of Yule *et al.* (2007, p. 146)

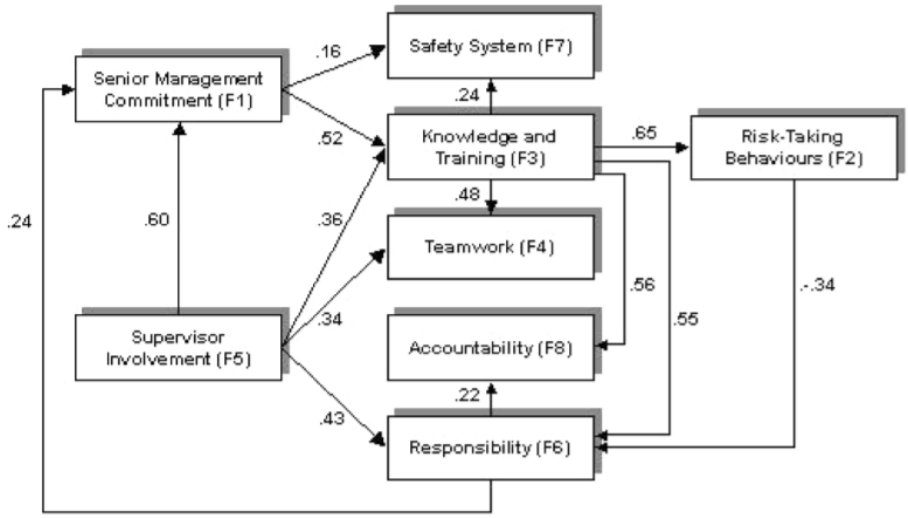


Figure 2.3 indicates that top management and supervisors have different roles in promoting the safety climate. Senior managers determine, in cooperation with their H&S experts, the HSMS of the organisation and assume corresponding leadership roles (Zohar, 2010). Additionally, they provide the resources for knowledge and training. Supervisors create the practical elements of the safety climate, such as teamwork and personal responsibility. Employees' perceptions of risk-taking behaviours and accountability are determined by supervisors' actions and decisions (Zohar and Luria, 2005). The analysis of Yule *et al.* (2007) revealed major relationships between management activities and employee perceptions. They concluded that top management can reduce risk-taking behaviours (and thus accident rates) by investing in knowledge and training and by encouraging supervisors' H&S involvement. Supervisors facilitated interactive communication between management and staff, as well as the inclusion of employees' ideas for H&S improvements.

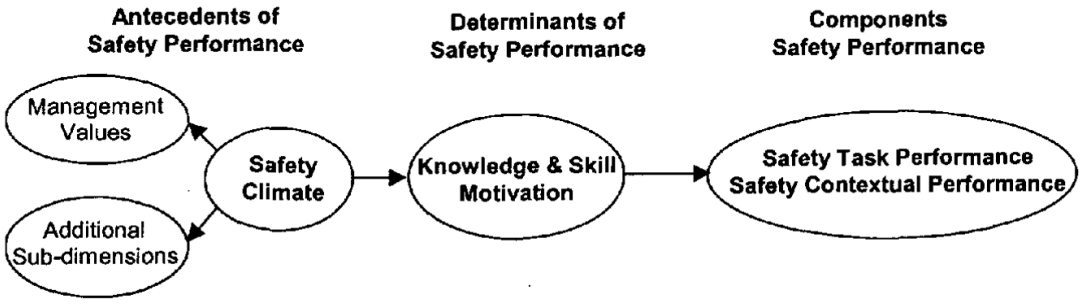
Employees' perceived responsibility, that is, their understanding of their work's H&S risks, is a key element in the model of Yule *et al.* (2007) because it provides a feedback loop for the perception of management commitment. According to their data, this element of safety climate was improved by investing in knowledge and training. Due to the information provided, workers felt better equipped to deal with the risks of their job. At the same time, they developed the common perception that management was committed. The positive perception of safety climate led to an improved perception of

the safety system. Interestingly, there was also a negative correlation between a low propensity to risk-taking behaviour and responsibility. Yule *et al.* (2007) explained this with situations in which employees were dissatisfied with the practicalities of H&S rules. In such cases, they followed the rules and showed a low propensity to risk taking despite not understanding or agreeing with the procedures defined by management. This reflects the importance of creating an understanding of H&S procedures among staff to creating a good safety climate.

In the model of Yule *et al.* (2007) all perceptions of employees concerning the H&S conditions were considered elements of the organisational safety climate. The overall score was used as a predictor of accidents and other safety-related incidents (for example near misses). Other authors defined safety climate more narrowly (Braunger *et al.*, 2015; DeJoy *et al.*, 2004; Griffin and Neal, 2000; Vinodkumar and Bhasi, 2010) in order to distinguish between climate elements that managers influence and the resulting H&S outcomes. Griffin and Neal (2000) presented the following model:

Figure 2.4

Safety climate model of Griffin and Neal (2000, p. 349)



Griffin and Neal (2000) considered management values, such as commitment or concern for employee well-being, to be the central elements of the safety climate. The importance of management in creating a positive safety perception among organisational members is generally confirmed in the literature (DeJoy *et al.*, 2004; Vinodkumar and Bhasi, 2010; Zohar, 2010). Sub-dimensions of Griffin and Neal (2000) were safety communication, safety practices, safety training and safety equipment. Their quantitative employee survey with 326 participants statistically confirmed the relationships between safety climate, as an antecedent of safety performance, and the determinants and components of safety performance. Griffin and

Neal (2000) defined knowledge and motivation as determinants of performance. Their data showed that both elements are equally important, while Yule *et al.* (2007) emphasised the extraordinary importance of knowledge. Braunger *et al.* (2015), in contrast, found that motivation is the essential determinant of safety performance, while knowledge aspects are less important. The terms 'task performance' and 'contextual performance' in Figure 2.4 refer to workers' safety compliance and their safety participation.

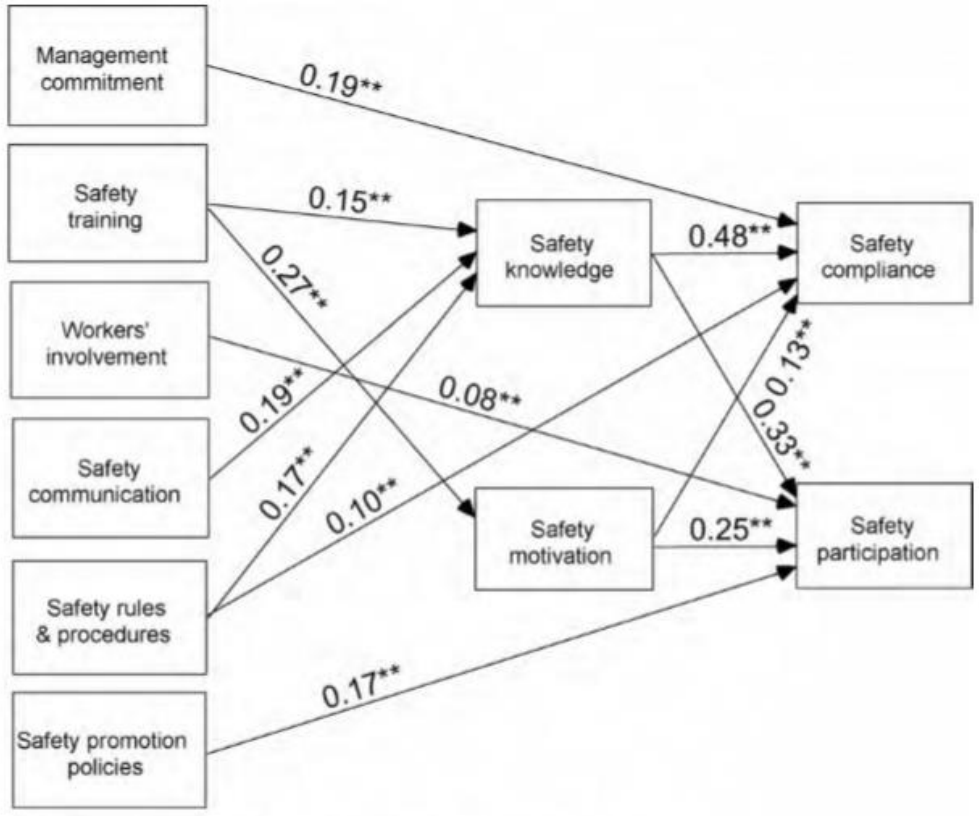
General organisational support for employees may be considered a determinant of safety climate (DeJoy *et al.*, 2004; Wallace *et al.*, 2006) rather than part of management's safety values, defined by Griffin and Neal (2000) as concern for employee well-being. Communication, too, may be regarded as general organisational characteristic rather than being considered purely as safety communication. Based on data from a quantitative questionnaire survey among 2,208 employees of a retail chain in the United States, DeJoy *et al.* (2004) found that these two factors, which reflect basic organisational values, had significant influence on safety climate. Safety climate was defined as employees' common perception of management support for safety and the importance of safety in day-to-day business. Safety policies and programmes were investigated with regard to such elements as safety training, hazard communication and personal protective equipment. Together, the terms 'safety climate' and 'safety policies' of DeJoy *et al.* (2004) correspond to the more comprehensive definition of 'safety climate' by Griffin and Neal (2000).

Employees' perceptions of risk in their work environment is another important determinant of safety climate (DeJoy *et al.*, 2004). The riskiness of the work environment affects both the HSMS and the safety climate/culture. According to Leiter *et al.* (2009, p. 1), risk perception is affected by employees' *"evaluation of the prevalence and harmfulness of hazards in their environment"*. They completed a quantitative survey with 350 workers from six departments in an Italian printing press company. By comparing responses from different departments with high and low injury rates, respectively, Leiter *et al.* (2009) found that employees in the high-injury units perceived their work environment to be more dangerous. Injuries from accidents that had happened within the organisation increased risk perception, especially the perceived prevalence of hazards. This higher risk perception was significantly related to higher compliance with safety regulations, although there was no additional safety training.

Vinodkumar and Bhasi (2010) developed a comprehensive model that describes the relationships between six elements of safety climate and organisational H&S conditions. With reference to the model of Griffin and Neal (2000), they identified six antecedents of safety performance in the literature and investigated their relationship with safety knowledge and motivation, that is, the determinants of safety performance, as well as safety compliance and participation, that is, components of safety performance. Vinodkumar and Bhasi (2010) conducted an employee survey with 1,566 participants in the Indian process industry. Figure 2.5 shows only the statistically relevant paths with $p < 0.01$, including standardised path coefficients.

Figure 2.5

Safety climate model of Vinodkumar and Bhasi (2010, p. 2090)



As shown in Figure 2.5, the six elements that constitute safety climate affected not only the determinants of safety performance, but directly determined safety compliance and safety participation. Vinodkumar and Bhasi (2010) expected safety promotion policies and workers' involvement to increase safety motivation, but the data did not confirm these relationships. The two factors did not predict safety knowledge, either. Instead of

affecting the determinants of safety performance as defined by Griffin and Neal (2000), these behavioural aspects of H&S management were directly related to the components of safety performance. Employees complied with rules and participated in activities without displaying increased motivation. This observation might be explained by the way motivation was framed in the questionnaire of Vinodkumar and Bhasi (2010), which mainly referred to feelings about the importance of H&S rather than considering employees' H&S opinions. The data of Vinodkumar and Bhasi (2010) indicated that individuals were willing to engage in H&S activities without considering it to be generally important. Alternatively, the direct effect on safety performance might be interpreted as manifestations of the social control of safety culture as described by Krzywicki and Keesey (2011).

Both safety promotion policies and workers' involvement are characteristics that describe the cooperation between the members of an organisation. These categories of Vinodkumar and Bhasi (2010) reflect the engagement of managers and employees in terms of H&S behaviour, which seems to be an important aspect of good H&S culture. Bronkhorst *et al.* (2018) confirmed, with their quasi-experimental quantitative study of Dutch healthcare organisations (comprising 520 participants who completed pre- and post-intervention questionnaires), that safety participation could be increased by means of management safety rounds and team discussions. The introduction of these H&S measures represented interventions that could be appropriately described as ways to promote safety and involve workers. They were applied in one half of the sample, and the resulting changes in safety climate were compared with the findings in the other half of the sample not experiencing interventions. Besides confirming the effectiveness of such H&S measures, Bronkhorst *et al.* (2018) found that H&S projects should also result in actual changes in day-to-day practices if safety climate was to be improved.

With respect to rule-based governance, Vinodkumar and Bhasi (2010) indicated that H&S compliance was directly increased if employees perceived that management was committed, that is, that top managers decided in favour of good technical H&S solutions. Vinodkumar and Bhasi (2010) also found that training is essential to maximise safety. Additionally, communication and safety rules have a positive influence on employees' knowledge. This corresponds well to the so-called informed safety culture of Reason (1998), which was identified as an important prerequisite for good H&S performance in the previous section.

2.3.1 Summary of safety climate as a quantitative indicator

The research on safety climate in recent decades has revealed the influence of management on H&S conditions. The development of employees' H&S opinions and their effects have been investigated by quantitatively evaluating employees' shared perception of H&S behaviour. Griffin and Neal (2000) distinguished between climate elements that managers influenced and the resulting H&S outcomes. In their view, management activities, particularly the H&S commitment managers demonstrate, affect employees' knowledge and motivation, which in turn determine employees' compliance with H&S rules and their engagement in H&S improvements. Based on this model, Vinodkumar and Bhasi (2010) showed the importance of six elements of safety climate that should be considered when implementing an organisational HSMS.

2.4 HSMSs as a top-management tool

According to Reason (2016), today's HSMSs are the result of authorities' moves towards enforced self-regulation since the early 1970s. This is true if one looks at the formal systems defined in norms such as OHSAS 18001. Facing the regulatory environment, many managers, particularly in larger organisations, implement a formal HSMS to comply with laws. However, due to the complexity of the managerial context, the implementation of an HSMS requires a broader focus. Guldenmund (2010, p. 1477) stated:

> *"Although compliance to [sic] current regulation might often be a first step, this is certainly not the final goal of most [management] interventions. On the contrary, they are aimed at establishing an effective SMS [safety management system] as opposed to a paper tiger bureaucracy of rules and procedures."*

The top management decisions that define an HSMS refer to documented processes and structures as well as behaviour-oriented activities. As described in section 2.2, safety culture may be considered the extension of traditional governance-oriented H&S management to the behavioural determinants of H&S conditions.

Section 2.3 shows that there are certain essential elements that must be considered in order to create an effective HSMS. Vinodkumar and Bhasi (2010) showed that, besides management commitment and workers' involvement, both specific H&S measures (that is, safety rules and procedures as well as safety training) and general H&S measures (that is, safety communication and safety promotion policies) are important.

In the literature, the term 'HSMS' is used with reference to both documented and non-documented management systems. Those authors who focus on the topic of safety culture, especially the consulting view, emphasise the importance of documentation (Reason, 1998; Frick, 2013b). In their view, an HSMS should be comprehensively documented in order to work well. These formal HSMSs then form the basis for top managers' leadership, motivating their organisation's members to comply with the rules and to participate in safety measures. In the more general literature and in articles about safety climate, the definition of HSMSs is not limited to formally documented structures and processes but refers to the organisational H&S management approach as a whole (Guldenmund, 2010; Vinodkumar and Bhasi, 2010; Yorio *et al.*, 2015). The authors focus on employees' perceptions and behaviours, assuming that these ultimately result in both good H&S conditions and the required HSMS documentation. Guldenmund (2010, p. 1477) emphasised that an HSMS must provide *"a framework for meaning and a reference for behaviour"*. This study follows the broad definition of HSMSs as presented by Yorio *et al.* (2015, p. 221):

> *"a set of institutionalised, interrelated, and interacting strategic H&S management practices designed to establish and achieve occupational safety and health goals and objectives"*.

Hudson (2007) described how the organisational safety culture was engineered in the multinational oil and gas company Shell. He stated that by the late 1990s it was clear to the company's management that a further improvement of the H&S conditions was not possible through changes to the formal HSMS, but only by specifically motivating employees to change their behaviour. Therefore, the HSMS was amended with a cultural toolkit that teams were to apply locally to develop an improved safety culture. In order to describe progress, Hudson (2007) developed five categories of cultural characteristics that were similar to the DuPont Bradley Curve (Figure 2.2), extended by

an initial stage of no care for H&S issues. His model also included the idea of social control within the organisation, as he urged *"that those within the culture raise themselves up"* (Hudson, 2007, p. 708). The corresponding project at Shell began in 1998 as a research project and was then rolled out throughout the organisation in 2004. The tools were mostly not introduced top-down; instead, their application was promoted by a group-wide marketing campaign under the logo 'Hearts and Minds'. The approach corresponded well with the literature on safety culture, but Hudson (2007) presented no evidence that this form of H&S management was effective.

Smaller companies often have little documentation of their general and H&S activities. Their management practices are far from creating a *"paper tiger bureaucracy"* (Guldenmund, 2010, p. 1477), preferring a pragmatic informal management approach – before the introduction of enforced self-regulation as well as today – because they lack the resources and the understanding to create comprehensive documentation (Fairman and Yapp, 2005a; Hale *et al.*, 2015). Nevertheless, they may have good H&S management because top managers are in closer contact with their employees and know much about actual working conditions (Meggeneder, 2007; Frick, 2013b). Creating good H&S conditions and complying with regulatory rules may even represent conflicting targets. Based on an HSMS audit in a Swedish fire department, Alavaara (2007) concluded that the relationship between an HSMS and regulatory compliance should be played down in order to avoid employees considering H&S measures to be bureaucratic efforts rather than useful improvements.

The empirical studies of Nordlöf (2015), with 142 and 188 small and medium-sized enterprises from the Swedish manufacturing industry, indicated that the degree of formalisation of HSMSs was related to four organisational characteristics:

- Size: The larger the organisation, the more developed the formal HSMS was.
- Safety climate: There was a positive correlation between employees' answers in a questionnaire survey on safety culture and the existence of a formal HSMS; however, safety climate did not depend on organisational size.
- Creditworthiness: Companies with low creditworthiness had worse HSMSs.
- Group companies: Enterprises that belonged to a corporate group tended to have a more formal HSMS.

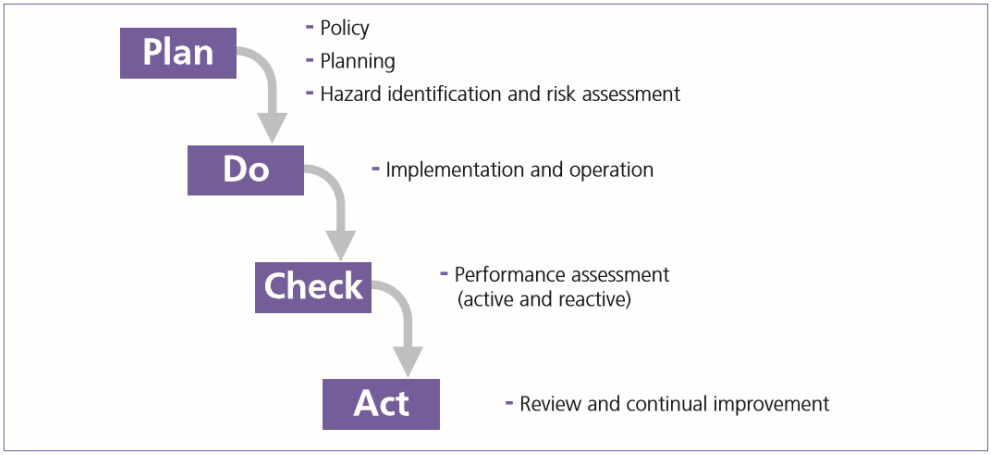
The correlation between creditworthiness and HSMS development exemplifies the general conflict between production and safety. Nordlöf (2015) explained the effect of size with the limited resources of smaller organisations. He therefore recommended that small organisations should try to consult with the authorities or larger organisations to develop their own formal HSMSs. This recommendation was also based on his finding that small companies had more formalised HSMSs if they were part of a corporate group. However, he did not consider the alternative perspective of Meggeneder (2007) and Frick (2013b), who referred to the positive effect of direct relationships between managers and employees in small organisations. The latter may indeed explain why Nordlöf (2015) found that safety climate, in contrast to HSMS formalisation, did not depend on organisational size.

There is an ongoing debate about how formal the procedures and objectives of HSMSs should be and whether such systems should be certified according to generally applied standards (Podgórski, 2015; van Guldener *et al.*, 2013; Wachter and Yorio, 2014). Such standards put administrative and technical controls at the centre of HSMSs. They focus on continuous improvements through systematic risk assessments and engineering measures in unsafe working environments (Yang, 2012), while hardly taking behavioural aspects into account (Wachter and Yorio, 2014). They are based on the principle of *plan, do, check and act* (PDCA) developed by William Edwards Deming in the 1950s with a view to quality management (IOSH, 2015).

The PDCA approach illustrated in Figure 2.6 corresponds to a variety of management systems, such as OHSAS 18001 and ISO 45001 for H&S management, ISO 9000 for quality management and ISO 14000 for environmental management. Figure 2.6 may also be presented as a cycle, because after a measure has been completely implemented (*act*), the next planning phase begins. As indicated in the diagram, planning is generally considered central to a formalised HSMS, implying defining an H&S policy, planning corresponding measures in detail and analysing the H&S conditions by identifying hazards and assessing risk (IOSH, 2015). Such management systems might be considered a tool for assisting organisations in complying with the legal requirements of the EU Framework Directive 89/391/EEC (Brocal, 2018).

Figure 2.6

PDCA diagram for HSMSs (IOSH, 2015, p. 3)



Podgórski (2015) claimed that after more than 20 years of increasing usage of certified H&S management systems there still is no evidence that such systems improve H&S conditions. IOSH (2015) mentioned advantages such as defined H&S priorities, clear lines of communication, comprehensive risk coverage and support of legal compliance. However, from an empirical study in the Netherlands, van Guldener *et al.* (2013) found that belonging to a certain industry is much more relevant for the character of an organisation's HSMS than the existence of a certified management system such as OHSAS. In terms of a modern H&S approach, ensuring good H&S conditions and complying with regulations tend to represent two separate, only partly related goals (Guldenmund, 2010; Saracino *et al.*, 2015).

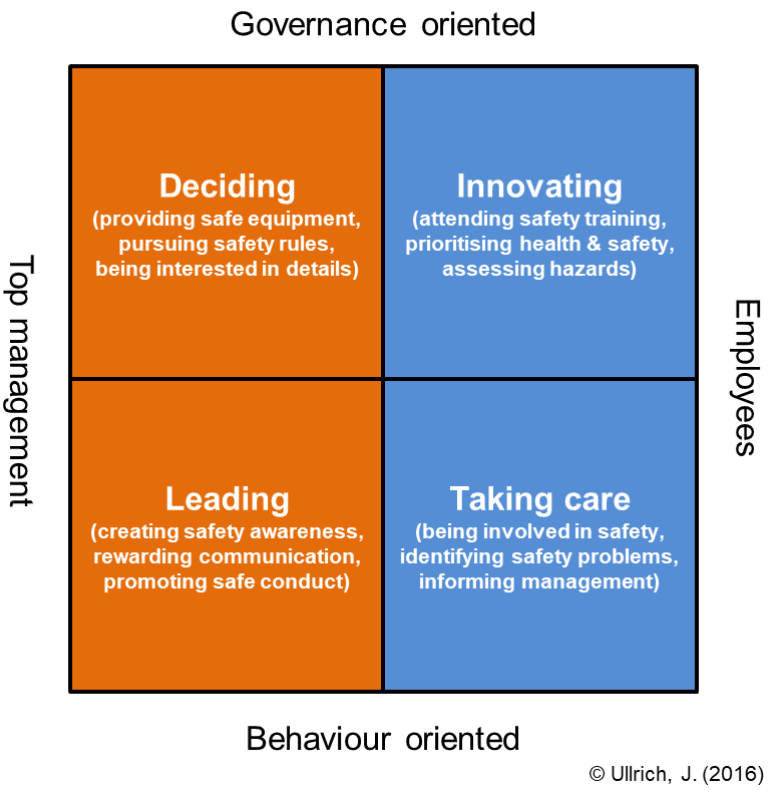
The modern, proactive approach to H&S management implies that rules and measures (including target definitions) are developed close to the workplace with the involvement of employees and supervisors. The basic assumption is that those at the site know best about the actual working situation. This approach implies bottom-up innovation processes to improve workplaces (Drais *et al.*, 2008; Hale *et al.*, 2012) and top-down HSMS definitions and resource allocation (Reason, 1998; Guldenmund, 2010). As in general innovation processes, top managers have to assume a dual leadership role (Denti, 2013). First, they create the necessary organisational climate for H&S innovations through open communication, employee involvement and corresponding incentives. Second, they *"embody the organization's desire"* (Denti, 2013, p. 22) by defining ambitious H&S policies and processes and providing the necessary resources for employee training and workplace equipment. Both roles in innovation are generally best assumed by applying a transformational leadership style (Denti, 2013), that is, by

creating an H&S vision and by supporting employees' H&S initiatives. However, in H&S management, transactional leadership styles that focus on compliance with existing rules are also necessary to ensure basic compliance (Griffin and Hu, 2013). There must be clear lines of punishment to prevent incidents resulting from unequivocally dangerous actions by employees (Reason, 1998). In the best case, information about H&S-related experiences is shared among all members of the organisation in order to ensure that both managers and employees know about all relevant *"human, technical, organizational and environmental factors that determine the safety"* (Reason, 1998, p. 294).

The reviewed literature on HSMSs suggests that there are two main dimensions that determine the effectiveness of an HSMS: the engagement of top management and employees in running the HSMS, and the orientation towards either rule-based governance or initiative-based behaviour. To ensure good H&S performance, top management must create an HSMS that is well positioned along these two dimensions. Figure 2.7 was developed by the author as a HSMS model that forms the theoretical basis for HSMS analysis in this study.

Figure 2.7

Elements of an effective HSMS (developed by the author)



The four categories shown in Figure 2.7 operationalise the two managerial dimensions that determine effectiveness according to the literature. The author derived the categories from the six elements of the safety climate model of Vinodkumar and Bhasi (2010), taking his own H&S experience as head of power plant operations into account. The objective was to develop a tool for describing H&S management practices at the participating fire departments. The explanatory subtitles refer to the questions Vinodkumar and Bhasi (2010) used in their employee survey. Their category 'management commitment' was changed to 'deciding' because the associated questions mainly referred to top-management decisions (based on management interest) in favour of time or capital for H&S measures. The additional element of 'safety rules & procedures' was included in this category because it directly reflects the decisions. The category 'promotion policy' was renamed 'leading', as the questions about H&S events, rewards and competition all refer to valuing H&S behaviour. The category 'workers' involvement' was translated into the more practical term 'taking care'. The additional topic of 'safety communication' was considered in both 'leading' and 'taking care'. The term 'innovating' was taken from Drais *et al.* (2008) and comprised the questions about training, knowledge and hazard assessment of Vinodkumar and Bhasi (2010).

The model depicted in Figure 2.7 also covers the four types of controls that Reason (2000, p. 8) derived from his studies on safety culture:

- *"administrative controls (prescriptive rules and procedures),*
- *individual controls (selection, training and motivators),*
- *group controls (supervision, norms and targets), and*
- *technical controls (automation, engineered safety features, physical barriers)".*

In the model described above, the administrative and technical controls are combined in 'deciding', while the group controls are split into 'leading' and 'taking care'. The so-called individual controls described by Reason (2000) correspond to the element of 'innovating'. Thus, the elements of an effective HSMS as shown in Figure 2.7 distinguish more clearly between the actions of top management and those of employees, while still reflecting the difference between governance and behaviour.

2.4.1 Summary of HSMSs as a top-management tool

The objective of an HSMS is to create good H&S conditions on the basis of mutual information and organisational innovation processes. At the same time, demands of H&S authorities should be considered, for example written risk assessments. Also, legal practices may require certain minimum standards of documented H&S rules. Thus, H&S management is a complex task that must take into account the overall situation in the organisation as well as the regulatory and legal context. A balanced management approach is needed that can be analysed with the help of the HSMS model described in this section.

2.5 Enforced self-regulation as a modern regulatory approach

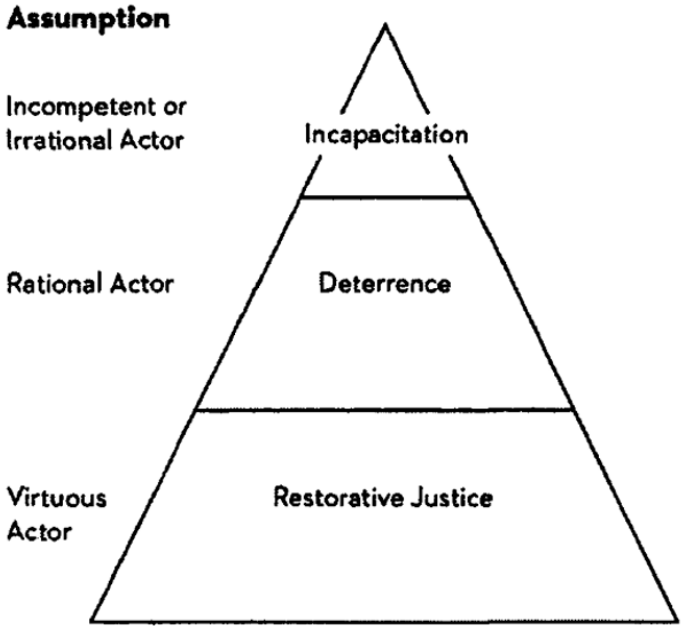
Enforced self-regulation of H&S has been spreading around the world since the early 1970s (Reason 2016). The European Union adopted the approach with the Framework Directive 89/391/EEC on Safety and Health at Work on 12 June 1989 (Ales, 2013). The corresponding laws were introduced in the member states in the 1990s. The directive provided a framework for the system of enforced self-regulation, while the content (the scope of obligations and regulatory sanctions) was nationally defined (Ales, 2013). In general, the degree of command and control in H&S regulation is declining because the regulatory definition and enforcement of detailed technical and procedural rules is becoming increasingly difficult in an ever more complex business world (Reason 2016). However, there are considerable differences between countries. For example, H&S regulation in the United States tends to be closer to command and control than the Australian approach (Yang, 2012). In the EU, those countries that moved in the direction of enforced self-regulation in the 1970s, for example Sweden, are further developed than the followers, such as the Netherlands and Germany (Walters and Wadsworth, 2014).

Enforced self-regulation provides companies with the freedom and the duty to define their HSMS independently (Reason, 2016). Managers are allowed to develop their own technical and organisational solutions for H&S problems as long as the resulting risks for employees are acceptable according to generally applicable standards (Gregor, 2006). In contrast, under command and control, managers are responsible only for

implementing the measures that are defined by the regulator (Hale *et al.*, 2012). Accordingly, regulators' activities in a system of enforced self-regulation differ considerably from their actions under command and control. Inspectors are more consultants than enforcers (Beck, 2011), and they respond to the H&S activities of companies and industries (Johnstone, 2014). The enforcement pyramid (Figure 2.8) as presented by Braithwaite (2011) is central to this responsive regulation.

Figure 2.8

Enforcement pyramid (Braithwaite, 2011, p. 486)



The assumption of the enforcement pyramid is that there are three major types of companies or managers, respectively. The first is virtuous actors that understand and assume their H&S responsibilities and are willing to create good H&S conditions for their employees. The second type is rational actors that invest in H&S measures only when there are obvious economic or business advantages to doing so. The third is incompetent or irrational actors that are either unable or unwilling to follow the rules. It is generally assumed that most managers are virtuous actors who are willing to create good H&S conditions for their employees (Bluff, 2011; Braithwaite, 2011; Fairman and Yapp, 2005a; Frick 2013b). Accordingly, most regulators' actions fall in the category of restorative justice, comprising informing and supporting companies with regard to H&S issues. Braithwaite (2011, p. 1) emphasised that,

> *"by having a capability to escalate to tough enforcement, most regulation can be about collaborative capacity building."*

If a manager is not willing to collaborate, the regulator will increase the pressure with sanctions, that is, by moving to deterrence. In the worst case, prosecution may result and end in incapacitation of the manager. A rational manager will be persuaded to take H&S measures only if the likelihood of the misconduct being detected is sufficiently high, that is, if there are frequent inspections (Johnstone, 2014; Tombs and Whyte, 2010). Additionally, regulators must be willing to move up the pyramid if they detect unacceptable H&S conditions. However, strong court sanctions are typically imposed only in the rare cases of severe accidents (Gunningham, 1998; Gregor, 2006; Johnstone, 2014), when managers may face legal prosecution for negligent injury or homicide. This split of the enforcement pyramid can result in severe problems, as Gunningham (1998, p. 224) emphasised:

> *"The regulated enterprise, knowing that even if it is detected no serious enforcement action will be taken unless there is a serious injury (and in this case its general approach to safety will be a secondary consideration anyway), is unlikely to undertake expensive remedial action."*

The frequency of H&S inspections has generally decreased since enforced self-regulation was introduced in the countries of the European Union (Frick and Johansson, 2013; Satzer, 2011; Tombs and Whyte, 2010). Based on the new regulatory approach, and due to limited personnel resources, regulators have shifted their focus from enforcement to promoting awareness and educating employers (Tombs and Whyte, 2010). Inspections are also difficult in the system of enforced self-regulation because authorities have only limited information about organisations' risk assessments and safety measures (Tombs and Whyte, 2010; Satzer, 2011). As shown in Figure 1.1, only just over one-third of companies in the European Union have their own staff conduct regular risk assessments (EU-OSHA, 2015). This is peculiar because the central idea of such risk assessments is that those who do the job are best qualified to evaluate risks. Indeed, employee engagement is a central element of modern H&S management. As

most enterprises do not act accordingly, this might point to the weakness of today's H&S self-regulation in the European Union.

Managers' decisions are affected not only by regulators but also by market forces and industry culture. Market forces comprise both economic pressure from competition and workers' demands pushed through with the support of trade unions (Makin and Winder, 2008; Reason, 2016). Industry culture refers to H&S practices that are considered appropriate among managerial peers, such as non-executive directors, or that are applied in response to the demands of key customers (Bluff, 2011). The effect of customers includes the influence of supply chains that have become increasingly relevant in certain industries in recent years (EU-OSHA, 2012b; Jensen *et al.*, 2010). In those industries, larger players act as regulators in the lower part of the enforcement pyramid of enforced self-regulation. Top managers have to balance the competing forces of production and safety (Reason, 2016). If there is less pressure in the direction of safety, the balance seems to move towards production. Baldwin and Black (2007) stated that there might be situations in which managers do not respond to regulators' orders due to stronger pressure from the prevailing culture in an industry or from economic business forces.

Hawkins (2002) asked H&S inspectors from the Health and Safety Executive authority in the United Kingdom about their assumptions regarding managers' reasons for compliance or non-compliance. He assumed that the national H&S authority developed its regulatory strategies on the basis of inspectors' theories of managerial behaviour. With respect to economic motivations, a former deputy director of the authority stated in one of the qualitative interviews (Hawkins, 2002, p. 261):

> *"A lot of safety, of course, doesn't cost any money, it costs management effort and management time… So they don't do it, because there are other things that they want to do with their time and effort."*

Thus, in contrast to the assumption of Baldwin and Black (2007), the practical experience of the H&S authority suggested that economic reasons were not relevant. Instead, the inspectors confirmed the second main suggestion of Baldwin and Black (2007), which referred to the importance of industry culture. According to Hawkins (2002, p. 263), there were some managers who did *"not recognise the necessity or*

legitimacy of compliance with regulation". Certain industries were observed to exhibit a common attitude of non-compliance which H&S authorities might tackle with the help of H&S opinion leaders and roles models (Bluff, 2011). It would also need to be ensured that H&S responsibilities are clearly allocated to individual managers because, for example, subcontracting might create confusing situations. Overall, the inspectors were convinced that most managers aimed at complying with H&S laws because they wanted to be good citizens and cared for their employees. Besides such ethical and moral aspects, legal deterrence and regulatory advice were considered important.

2.5.1 Summary of enforced self-regulation as a modern regulatory approach

From a managers' perspective, enforced self-regulation may be considered complex and ambiguous. In contrast to command and control, sanctions by inspectors are not precisely specified, but depend on the circumstances. Organisations have the freedom and the duty to define their HSMS independently (Reason, 2016). Therefore, managers must implement an HSMS that ensures appropriate organisational H&S conditions (Beck, 2011). MacEachen *et al.* (2016) stated that the regulatory environment of organisations is often inconsistent because several authorities are active in H&S regulation, resulting in rather confusing signals to managers. At the same time, market forces and industry culture affect their H&S decisions (Makin and Winder, 2008; Bluff, 2011). The resulting complexity creates insecurity and additional business risks as managers have no clear guidelines on how to act. Accordingly, managers' H&S motivations for implementing an organisational HSMS may be expected to be diverse. According to Hawkins (2002), H&S inspectors experienced that moral considerations, industry culture and legal deterrence were important factors in determining H&S compliance on the part of top management.

2.6 The role of managers and their motivations

Comparatively few studies have been conducted on managers' decision-making in organisational, regulatory, business and social environments (Bluff, 2011; Njå and Fjelltun, 2010; MacEachen *et al.*, 2016). Studies that investigated how regulation and other external forces affect the H&S activities of managers mainly looked at the

outcomes of H&S management, that is, the H&S conditions in individual companies or whole industries (MacEachen *et al.*, 2016). Such studies typically created quantitative data on rates of compliance, shares of companies with certain HSMS features, and injury rates in organisations or industry sectors (Frick and Johanson, 2013). This perspective on H&S does not sufficiently consider the role of managers in creating an HSMS, and with it, the H&S conditions in an organisation (Frick, 2013b).

Hale *et al.* (2010) concluded from their study on publicly subsidised H&S interventions in Dutch companies that the initiative of top managers and safety professionals is essential to promote H&S within organisations. Together they ensure that the resources and knowledge needed to implement H&S measures are available. Additionally, they ensure that information is shared within the organisation. Hale *et al.* (2010, p. 1034) emphasised the importance of management commitment and stated:

> *"The introduction of formal management systems and the negative influence of unfavourable markets and organizational change are shown to be less important or irrelevant."*

Frick (2013a) presented a longitudinal case study in a large public organisation between 2007 and 2009. He and his team observed the introduction of Leksand's 'Hälsosam' project, which aimed at improving the H&S conditions. Leksand is a rural municipality of about 15,000 inhabitants in Sweden. The public organisation had 1,300 employees in 190 types of jobs and was organised into six administrative departments. The qualitative data of Frick (2013a) comprised 76 documents, 37 participant observations and 35 interviews with members of the organisation, both managers and staff. He described the conditions in the organisation as very much in favour of cooperative working and negotiation. The employer was open to dialogue and the employees had significant power because 85% of them were union members. Accordingly, the implementation of 'Hälsosam' was agreed between the social partners. It resulted in better compliance with formal demands of H&S legislation. However, the resulting H&S system was not driven by content, but by form. Top managers were measuring *"input activities, such as number of safety rounds, meetings, and training"* (Frick, 2013a, p. 80) rather than monitoring workplace risks and employee health. The

management of actual H&S working conditions was left to the lower ranks of management, as Frick (2013a, p. 81) described:

> *"Like other municipalities, many of Leksand's workplaces were inspected by the Swedish Work Environment Authority during 2003–2006, which resulted in many inspection notes. However, Leksand left it to the lower management to answer and comply with the authority's requirements. Higher managers (and even less politicians) did not reflect on the shortcomings in their management that had caused the violations found in the inspections."*

The lack of top-management engagement and commitment made it difficult or even impossible for lower management to improve H&S conditions. This was the case despite the improved cooperation and communication between managers and union/safety representatives resulting from the introduction of 'Hälsosam'. Thus, this case illustrates that the HSMS must not omit the contents of organisational H&S processes.

Knowing the key role of top management in promoting H&S, the question arises, why are managers willing to engage in H&S? As described by (DeJoy *et al.*, 2004), an organisational HSMS reflects the values and beliefs of top management. The decisions of managers affect the safety conditions in workplaces and determine the likelihood of harm to employees. This implies a typical moral and ethical question. Individuals may feel that avoiding harm to others is a universal moral rule, or they may consider harming people to be sometimes necessary to create benefits (Tsahuridu, 2003). Though managers do not directly harm employees with their H&S decisions, they accept or reject risks to employees' health when deciding on work processes and equipment. Accordingly, H&S management implies ethical decision-making.

There have been only a few studies in which managers were specifically asked about their motivations for engaging in H&S (Bluff, 2011). According to Njå and Fjelltun (2010, p. 1076), H&S activities are

> *"part of priorities concerning time pressures, equipment, manning, salaries, communications, procedures, etc. Managers' attitudes are assumed to play a major role in the prioritising work and, hence, in constructing the safety climate in the work place."*

It is known that managers' H&S engagement is based on legal, economic, and social-context motivations (Bluff, 2011). These are the drivers that determine the implementation of HSMSs in organisations. However, many of the existing studies were limited to the relationship between regulatory inspections and formal compliance, which is less relevant for the system of enforced self-regulation (Fairman and Yapp, 2005b) because the material H&S rules are, to a large extent, defined through negotiations between managers, employees and authorities.

In Australia, the results of a quantitative telephone survey indicated that only about 20% of managers did not care about H&S in their organisations (KPMG, 2001). This figure was similar across all firm sizes. Njå and Fjelltun (2010) found a corresponding figure when investigating the views of managers of small and medium-sized enterprises in the Norwegian transport sector. About 75% regarded H&S as important for their enterprise's reputation, while only 25% thought that H&S measures compromised their competitiveness. Also qualitative interviews in German craft businesses (Beck, 2011) found that just 30% of participating top managers of small businesses did not want to engage in H&S management. Thus, studies have shown that the large majority of managers across various countries and industries are in favour of H&S management.

KPMG (2001, p. 8) identified the following main motivations of managers:

> - *"A sense of moral responsibility for the health and safety of their colleagues;*
> - *Regulation and its enforcement;*
> - *Commercial incentives such as greater productivity and lower workers' compensation premiums; and*
> - *Measurement and benchmarking of health and safety performance."*

The latter three motivations reflect those extensively described by Bluff (2011), where legal motivations referred to regulation and enforcement, economic motivations corresponded to commercial incentives and benchmarking was described as comparison with other managers. The sense of morality, which KPMG identified as most important, was not mentioned as a major motivation in other studies (Beck, 2011; Fairman and Yapp, 2005a; and Baldock *et al.*, 2006). Indeed, Bluff (2011) claimed that moral issues were rarely mentioned in empirical studies on managers' responses to H&S regulation. However, the difference may result from an unclear definition of morality. Legal and social-context motivations may also be considered moral motivations, as the corresponding behaviours are generally considered socially positive.

The additional motivators that KPMG (2001, p. 8) described as significant in only certain industries are all related to social-context issues:

- *"supply chain pressure;*
- *corporate image;*
- *performance linked pay;*
- *mass media campaigns; and*
- *safety information."*

Similarly, van Guldener *et al.* (2013) found in their study that the introduction of a certified HSMS was often done for image reasons, that is, as a result of forces from the social environment. The social context of management, that is, their belonging to a certain industry or organisation, seemed to be very important in general. For example, van Guldener *et al.* (2013) also found that belonging to a certain industry is much more relevant for the performance of an organisation's HSMS than the existence of a certified management system with well-defined HSMS processes, such as OHSAS 18001. Maslen and Hopkins (2014) presented qualitative cross-sectional case study research on safety incentives (called *"performance linked pay"* by KPMG, 2001, p. 8) for managers in large enterprises in the oil and gas, petrochemical, pipeline and mining industries. Interviews, observations and document analyses were conducted in 11 companies. They concluded that the main motivator for managers to engage in safety activities was not the incentive itself, but the evaluation process. Thus, financial incentives did not work as motivators. Instead, the related evaluation process provided social-context motivations because the managers wanted to meet their performance targets.

Fairman and Yapp (2005a) indicated that legal and economic motivations were most important for H&S activities. The aim of their study was to examine how managers of small organisations could be encouraged to change their behaviour so that they complied with H&S laws and regulations. Like Fairman and Yapp (2005b), they took an inspector's perspective (including compliance inspections as part of their interviews) and concluded that training and face-to-face information was necessary. Asking managers about their motivations was an additional part of their study, but they concluded that managers' motivations were practically irrelevant because managers did not decide whether to comply or not. In contrast, once a manager was aware of H&S requirements, he/she tried to improve the conditions in order to ensure compliance. Thus, it might not be necessary to motivate managers, but to create H&S awareness through information and training.

The reviewed studies on managers' H&S motivations indicated that, besides economic and legal issues, the social context of management decisions is important. These social-context motivations were described in different forms, such as moral duty, bench-marking, performance evaluation, reputation, supply chain pressure etc. The variety of manifestations indicates that social-context motivations tend to be more complex in nature than economic and legal motivations. The latter, which are often analysed in terms of deterrence, tend to be weaker under enforced self-regulation because the laws and regulations are rather unspecific (Fairman and Yapp, 2005a). Economic motivations are often cited in connection with small enterprises because regulatory costs of small organisations are decidedly higher than those of larger ones (Hale *et al.*, 2015). Larger organisations are typically more open to discussions with authorities, and their H&S measures often exceed legal standards, because they consider reputational risks more important than regulatory demands (Gunningham *et al.*, 2005; Hale *et al.*, 2015). The importance of economic motivations seems to decline with organisational size, while the importance of social-context motivations increases. Only medium-sized and large enterprises tend to follow the idea of continuous H&S improvements (Fairman and Yapp, 2005b). This core of modern H&S management is based on information exchange between an organisation's managers and stakeholders, including employees and H&S authorities. Such internal and external communication requires a positive social context (Makin and Winder, 2008; Reason, 2016). Therefore, social-context motivations are considered an important factor in modern H&S management.

2.6.1 Summary of the role of managers and their motivations

Although the initiative of top managers and safety professionals is essential to promote H&S within organisations (Hale *et al.*, 2010), there have been only a few studies on their decision-making in the field of H&S (MacEachen *et al.*, 2016). Managers' H&S engagement is based on legal, economic and social-context motivations (Bluff, 2011). Especially, social-context motivations have been described in different forms, such as moral duty, benchmarking, performance evaluation, reputation, supply chain pressure etc. These kinds of motivational factors mainly determine the information exchange between managers and organisational stakeholders, which forms the basis for a balanced HSMS under enforced self-regulation (Makin and Winder, 2008; Reason, 2016). Therefore, social-context motivations were expected to be of special importance.

2.7 Literature synthesis

There is considerable literature on safety culture, safety climate and HSMS implementation, but little has been written about the motivations of top managers in H&S decision-making. Management, however, determines the implementation of an HSMS with the allocation of resources as well as the definition of organisational structures and processes (Yorio *et al.*, 2015). Decision-making is an especially complex task in modern H&S management because it must be done with incomplete information and is expected to include negotiations with both authorities and employees (Fairman and Yapp, 2005a). In contrast to the regulatory system of command and control, enforced self-regulation provides few specific rules (Yang, 2012), being built instead upon open communication between H&S stakeholders (Frick, 2013a). This approach is pursued by authorities across the European Union on the basis of the EU Framework Directive 89/391/EEC on Safety and Health at Work (Ales, 2013). The idea is that top managers develop the HSMS in cooperation with their employees (EU-OSHA, 2012a). An HSMS may be considered the *"surface manifestations of the basic values and beliefs"* of top management (DeJoy *et al.*, 2004, p. 82).

Research on managers' H&S approaches indicated that they generally take their H&S responsibility seriously and are willing to invest in H&S measures (Beck, 2011; KPMG, 2001; Njå and Fjelltun, 2010). Most managers will engage with H&S consultation

processes with employees and H&S authorities if they become aware of non-compliance (Fairman and Yapp, 2005a) and if they perceive authorities to be willing to advise (Beck, 2011). Managers make decisions based on legal, economic, and social-context motivations (Bluff, 2011). Regulatory activities affect these motivations, as do influences from peers, competitors, trade unions, the public and others (Makin and Winder, 2008). Management decision-making regarding HSMS implementation is complex because the modern approach to H&S implies both bottom-up innovation processes to improve workplaces (Drais *et al.*, 2008; Hale *et al.*, 2012) and top-down rule definitions and resource allocation (Reason, 1998; Guldenmund, 2010). Ensuring good H&S performance requires a balanced management approach along two main dimensions. The first dimension is the engagement of top management and employees in running the HSMS. The second is the orientation of activities towards organisational governance or individual behaviour.

In their research, MacEachen *et al.* (2016, pp. 12-13) concluded that *"greater attention is needed to understand implementation realities."* They identified *"studies of employers as policy recipients"* as a gap in the literature. This is in line with the literature reviews of Bluff (2012) and Frick and Johanson (2013), who also stated that past studies on managers' H&S motivations and H&S activities took rather general perspectives. Researchers and authorities such as the European Agency for Safety and Health at Work typically used quantitative surveys to identify preferences and activities of managers (for example Baldock *et al.*, 2006; EU-OSHA, 2010; EU-OSHA 2015; KPMG, 2001; Njå and Fjelltun, 2010; Wachter and Yorio, 2014). Only a few qualitative studies considered why and how managers implemented an HSMS in their organisations (for example Beck, 2011; Fairman and Yapp, 2005a; Frick, 2013a). This literature gap was addressed by the following research question, aim and objectives of this study.

2.8 Research question, aim and objectives

To reveal why managers implement HSMSs of varying effectiveness, this study investigated the relationship between managerial motivations and management practices. This perspective on decision-making was considered important because top management determines the characteristics of the organisational HSMS and thus the

H&S conditions for employees. Managers' behaviour was expected to be based on legal, economic and social-context motivations. Therefore, top managers and the H&S experts advising them were asked about their ways of implementing an HSMS and their underlying H&S motivations. The codified answers were then compared in different regulatory environments. Relationships were identified and an empirically based typology of managers' H&S motivations was developed. The literature review provided the conceptual framework for achieving this study's research question, aim and objectives.

Research question:

> How are top managers' ways of implementing an HSMS affected by their H&S motivations in different regulatory environments?

Research aim:

> To identify how top managers' ways of implementing an HSMS are affected by their H&S motivations in different regulatory environments.

Research objectives:

- To codify top managers' ways of implementing an organisational HSMS.
- To codify top managers' perceptions of H&S authorities' regulatory approaches.
- To codify the H&S motivations of top managers.
- To identify relationships between managers' ways of implementing an HSMS and their H&S motivations in different regulatory environments.
- To develop a typology of managers' H&S motivations in their managerial and regulatory context.

2.9 Expected contributions to the scientific discourse

As recommended by Frick and Johanson (2013) and Zanko and Dawson (2012, p. 12), a qualitative *"holistic approach"* was used to investigate the complex context of decision-making in H&S management. Views and experiences of managers in the defined business of firefighting were evaluated across three countries. MacEachen *et al.* (2016) described a literature gap with regard to managers' receptivity to authorities' H&S policies. The views of the interviewed fire department managers in the different

regulatory environments of Germany, the Netherlands and Sweden provided insights addressing this gap. The resulting case studies of organisational HSMSs under varying regulatory regimes also exemplified different managerial approaches. Focusing on the business of firefighting rather than taking the cross-industry view of previous studies (Frick and Johanson, 2013; Walz and de Ruig, 2011) was expected to provide clearer indications of the relationships between top managers' H&S motivations and their ways of implementing an HSMS. The envisaged result was a typology of managers' H&S motivations in their managerial and regulatory context. The research was expected to contribute to the scientific discourse by adding a management perspective to the prevailing inspectors' view on formal compliance. The new perspective should help to better understand managers' motivations for their approaches to H&S management. The resulting knowledge should enable H&S authorities and other stakeholders, such as trade union representatives and non-executive directors, to improve their measures for promoting health and safety at work.

2.10 Expected contributions to applied business practices

Top managers' decisions on organisational HSMSs and specific H&S measures are the main determinants of employees' working conditions. Therefore, information exchange on ways of implementing an HSMS is relevant for both managers and employees. The case studies of organisational HSMSs at fire departments in Germany, the Netherlands and Sweden fostered such information exchange between the participating organisations and their national industry associations, as the researcher presented preliminary findings in anonymous form. The cases provided examples of current practices that could be applied across fire brigades and countries. Thus, this study could help both managers and authorities to improve their applied practices in the field of H&S management. Finally, an analytical tool for reviewing organisational HSMSs was tested and refined in order to provide a reference point for effective H&S management.

Chapter 3
Methodology

3.1 Qualitative methodology with a pragmatic paradigm

An organisational HSMS comprises comprehensive structures, processes and behaviours that require a holistic view in order to describe the HSMS appropriately (Frick and Johanson, 2013; Zanko and Dawson, 2012). Such systems are implemented in economic, legal and social contexts that influence the H&S motivations and activities of managers. The overall complexity of HSMSs and their environment reduces the meaningfulness of quantitative studies (Frick and Johanson, 2013). Surveys that identified the prevalence of certain elements of HSMSs (for example workplace risk assessments by internal staff as shown in Figure 1.1) cannot reveal how these elements work. Therefore, Frick and Johanson (2013) recommended using qualitative case studies to explain these complex social phenomena. Accordingly, this study relied on case studies that were built mainly upon qualitative data from interviews.

Despite its mainly qualitative methodology, this research drew on positivistic assumptions. The focus was on developing an explanation that was not limited to the context of the investigated cases, but was generalisable to other industries (Eisenhardt, 1989). The ontological idea was that there is an independent reality with determinant social laws that can be used to create desired social outcomes (Brinkmann and Kvale, 2015). At the same time, it was acknowledged that qualitative explanation building could not be precise because the researcher's mind always affects theory building (Yin, 2014). With reference to pragmatism, it was assumed that knowledge is constructed in order to improve general practices and foster change (Goldkuhl, 2012). Correspondingly, this study combined a qualitative data collection with positivistic assumptions, relying on variable-oriented constructs (Piekkari *et al.*, 2009) and data triangulation with multiple sources (Yin, 2014). In particular, the analysis of the interview transcripts took not only scientific and practical literature into account, but also organisational H&S documentation. The underlying pragmatic research paradigm is described by Creswell (2003, p. 12) as follows:

> *"Truth is what works at the time; it is not based in a strict dualism between the mind and a reality completely independent of the mind."*

Piekkari *et al.* (2009) found that it was typical for management studies to use qualitative interviews as the dominant data source and to apply a multiple-case design. In this study, fire department managers from selected fire departments in Germany, the Netherlands and Sweden were interviewed about their H&S experiences and motivations. The cross-sectional cases were analytically combined in order to develop categories of managerial practices and motivations and to describe national conditions as country cases. The motivation statements from the interviews were counted and quantitatively evaluated with respect to their managerial and regulatory contexts.

The aim of this study was to identify how top managers' ways of implementing an HSMS were affected by their H&S motivations. There were few research reports on this relationship in the literature. Accordingly, this study pursued an exploratory approach in the broad sense of Piekkari *et al.* (2009). According to Yin (2014), it was an explanatory study because the aim was to induct a concept that explained the phenomenon, not to develop a grand theory that was based on incremental extension of existing knowledge (Eisenhardt, 1989).

3.2 Case studies as a strategy of enquiry

Following Eisenhardt (1989), case studies were an appropriate research strategy for developing theory in the field of this study because there was little previous research. Typically, such cases are *"bounded by time and activity"* (Creswell, 2003, p. 15) and are most suitable when the *"boundaries between phenomenon and context may not be clearly evident"* (Yin, 2014, p. 16). They are typically based on qualitative data, although quantitative methods may contribute additional information (Yin, 2014). Case studies represent a social science research method that enables the researcher to keep a real-world perspective. Piekkari *et al.* (2009, p. 567) found that *"exploratory, interview-based multiple case studies, drawing on positivistic assumptions and cross-sectional designs"* are most common in qualitative management research. This study pursued a corresponding strategy of enquiry.

Creswell (2003) described the main strategies of enquiry that provide direction for research design in general. He distinguished between quantitative, mixed methods and qualitative. Quantitative strategies comprise experiments and surveys. Experiments are used to investigate causal relationships by manipulating defined variables and monitoring the effects on dependent variables, requiring a sufficient number of experiments in order to develop generalisable theories based on random sampling. Surveys are based on the same statistical principles as experiments but are done without manipulating variables, while sample characteristics are investigated by means of questionnaires. Creswell (2003) divided the mixed-methods approaches into three groups: sequential, concurrent and transformative procedures. A sequential procedure reflects a hierarchical view of research strategies, that is, qualitative exploration is followed by quantitative statistical analysis. Concurrent approaches are characterised by the simultaneous combination of qualitative and quantitative data for an overall interpretation of results. In transformative procedures, researchers use specific theoretical lenses when applying sequential and/or concurrent qualitative and quantitative data analysis.

Case studies are one of five qualitative strategies described by Creswell (2003). He stated that case studies are used to explore a new field of research in order to develop hypotheses that are subsequently tested with quantitative methods. In contrast, Eisenhardt (1989) and Yin (2014) emphasised that case studies can also be used to build explanatory theories, although they are predominantly based on qualitative data. Grounded theory, which Creswell (2003) describes as a second qualitative research strategy, is often done by combining cross-sectional case studies. It is based on continuous comparison of data with emerging constructs. Longitudinal case studies are not applicable for this purpose because multiple cases are needed. Eisenhardt (1989) extended the original concept of grounded theory. She presented a comprehensive process for theory building that was adopted as the research design of this study, as described in Chapter 4.

The remaining three qualitative research strategies according to (Creswell, 2003) are ethnographies, narrative research and phenomenological research. They may be used as methods within case studies or as stand-alone approaches. Ethnographies are primarily based on the observation of individuals' behaviour within their social context. Narrative and phenomenological studies are usually based on interviews with

individuals, but they differ in their approaches. In the former, participants' experiences are combined with the researchers' thoughts, while in the latter, the researchers intend to exclude their own experiences (Creswell, 2003). In this study, the qualitative interviews in the case studies were analysed with a phenomenological approach, as described by Brinkmann and Kvale (2015). The social phenomenon of HSMS implementation under enforced self-regulation was investigated based on the actors' experiences. The interviews with fire department managers were semi-structured in the sense that they were neither open conversations nor closed questionnaires (Brinkmann and Kvale, 2015). The answers were analysed in order to identify patterns and derive causal relationships. The combination of these answers with additional information from organisational H&S documents and literature analysis resulted in case studies describing the experiences of managers within their organisational and social contexts.

Pragmatism focuses on the consequences of actions, as the emphasis is on the practical value of the developed theories (Brinkmann and Kvale, 2015). Thus, the qualitative approach of this study was expected to yield outcomes that were relevant for practitioners. However, theoretical lenses may become problematic if they interfere with objectivity or promote biases (Sweetman *et al.*, 2010). Eisenhardt (1989) emphasised that theory building should begin with an open mind with no predefined perspective. At the same time, theoretical frameworks from the literature are recommended for explanatory case study research because they improve both the reliability and validity of results (Creswell, 2003; Eisenhardt, 1989; Yin, 2014).

3.3 Reliability, validity and generalisability

The term 'reliability' refers to the consistency and trustworthiness of findings (Brinkmann and Kvale, 2015). The underlying question is whether another researcher would identify the same causal relationships based on the investigated cases. Especially with interview data, there is a risk of low reliability because the interviewer's questions can influence the interviewee's answers (Yin, 2014). Additionally, the transcription and analysis of interview data may be affected by the researcher's attitudes (Brinkmann and Kvale, 2015). Both the wording of questions and the exact understanding of answers are important. It is necessary to describe and analyse the data as realistically as possible

in order to prevent bias. Eisenhardt (1989, p. 536) therefore recommended with respect to researchers:

> *"They should avoid thinking about specific relationships between variables and theories as much as possible, especially at the outset of the process."*

Semi-structured interviews were the main data source in this study. The researcher introduced the topic to the participants and then asked open questions – amended with clarifying enquiries – to investigate the participants' experiences. The interviews referred to theoretical frameworks that were derived from the literature. The HSMS model (section 2.4) and the literature-based motivational constructs (section 2.6), provided the theoretical background. Such frameworks enhance reliability because they determine which aspects of a topic are the focus of the qualitative investigation (Brinkmann and Kvale, 2015; Eisenhardt, 1989).

There are three kinds of validity: construct validity, internal validity and external validity (Yin, 2014). Construct validity refers to the correct description of a theory's variables. In this study, managers' ways of implementing an HSMS and their H&S motivations were the two variables to be analysed. Yin (2014) suggested that the key informants (which were the commanding officers and their H&S experts as top management of the organisations) should be allowed to review draft case study reports. This was ensured in this study.

Internal validity is often easier to ensure in qualitative case study research than in quantitative statistical evaluations (Yin, 2014). It is the nature of qualitative research that not only relationships between predefined variables, but also corresponding reasons and emerging details are investigated. This is important for building theories and explanations based on case studies (Eisenhardt, 1989). A broad range of literature should be considered when drawing conclusions from qualitative case study data. The theoretical background enables the researcher to ask the questions that are necessary for answering why emerging relationships may exist (Eisenhardt, 1989; Yin, 2014). The comparison of case study data with the literature contributes to the analysis either by identifying similar relationships or by yielding conflicting results. The latter represents opportunities for refining and extending conclusions (Eisenhardt, 1989).

External validity is also called generalisability. It refers to the idea that developed explanations should be applicable to different contexts. Multiple case studies follow the same replication logic as multiple experiments (Yin, 2014). Accordingly, the approach may also be referred to as quasi-experimental research (Brinkmann and Kvale, 2015). Cases contribute to theory building either by revealing similar relationships between variables or predicting contrasting results. The former is called *"literal replication"*, the latter, *"theoretical replication"* (Yin, 2014, p. 57). This replication logic improves both internal and external validity. According to Eisenhardt (1989), a main risk of theory building from case studies is that the explanations are too specific for generalisation. To mitigate this risk, she recommended the application of theoretical frameworks as general reference points during data analysis. By referring to a theoretically derived HSMS model (section 2.4) and taking typical motivational constructs into account (section 2.6), the findings of this research were related to the existing knowledge base. The generalisability was analytically evaluated, describing underlying reasons in detail. Brinkmann and Kvale (2015, p. 297) clarified this when they stated:

> *"By specifying the supportive evidence and making the arguments explicit, the researcher can allow readers to judge the soundness of the generalization claim."*

3.4 Ethical considerations

According to Yin (2014, p. 167), the analysis of case study evidence implies the following challenge:

> *"A challenge you must be prepared to meet in doing a case study is therefore to know how to develop strong, plausible, and fair arguments that are supported by the data."*

The development of such arguments requires not only an open-minded enquiry (Eisenhardt, 1989; Yin, 2014), but also ethical conduct. Findings that are contrary to the expected or desired theory must not be ignored during data analysis. During the

interviews, manipulation of participants must be prevented, as must co-optation (Brinkmann and Kvale, 2015). In general, interview questions should not lead in a predefined direction. An ethical researcher will strive for as much validity as possible without being distracted by practical constraints such as time and project resources. Taking responsibility for one's own work and abstaining from plagiarism and falsification are essential characteristics of an ethical researcher (Yin, 2014).

The project participants must be treated in a fair manner. This is a fundamentally moral obligation, though the terms ethics and morality are often used interchangeably (Brinkmann and Kvale, 2015; Tsahuridu, 2003). With respect to top managers, it means they should be convinced to participate based on a true and fair view of the benefits for their organisation and the efforts required of them (Darke *et al.*, 1998). With respect to interviewees in general, it must be ensured that individuals' identities will not become public. In this study, participants were informed about how confidentiality would be ensured, and the promised procedures were followed. All organisations and individuals were anonymised, both in the analytical memos (such as the case study report in Appendix C) and during further analyses. The list of participants was kept strictly separate from all other data. Additionally, each interview began with a general introduction of the purpose and procedures of the research project. This formed the basis for obtaining the informed and voluntary consent of all individuals with respect to participation, interview recording and data usage. During the interviews, the interviewer also did not exploit the superior position of the researcher in the conversational situation (Brinkmann and Kvale, 2015). For example, no pressure was put on participants to answer questions, allowing them to withdraw at any time.

Protecting participants from negative effects is an ethical dimension of special importance in social science (Brinkmann and Kvale, 2015; Yin, 2014). The researcher must be aware that certain answers may have negative consequences for participants. In the case of this research project, admitting non-compliance with H&S laws could possibly be used in either civil or criminal court cases against individual interview participants or their organisations. To prevent such ethical problems and ensure truthful answers from interviewees, this research was not aimed at investigating non-compliance. Instead, the interviews focused on the decisions of top managers regarding how (not whether) they created appropriate H&S conditions in their organisations.

According to Brinkmann and Kvale (2015), ethical behaviour in research projects must be learned. It implies not only compliance with predefined rules but also consideration of contexts, experiences and good practices in the research community. In their view, ethical behaviour requires the *"skill of thick ethical description"*, that is, *"the ability to see and describe events in their value-laden contexts and judge accordingly"* (Brinkmann and Kvale, 2015, p. 90). This broad definition of ethical conduct was taken into account. The researcher's background enabled a good understanding of contexts and examples, as he used to be a firefighter as well as a managing director with H&S responsibility. In terms of good practices in the community, the researcher was able to draw upon the interview training courses taken during his management education programmes. Accordingly, Edinburgh Business School granted ethical approval.

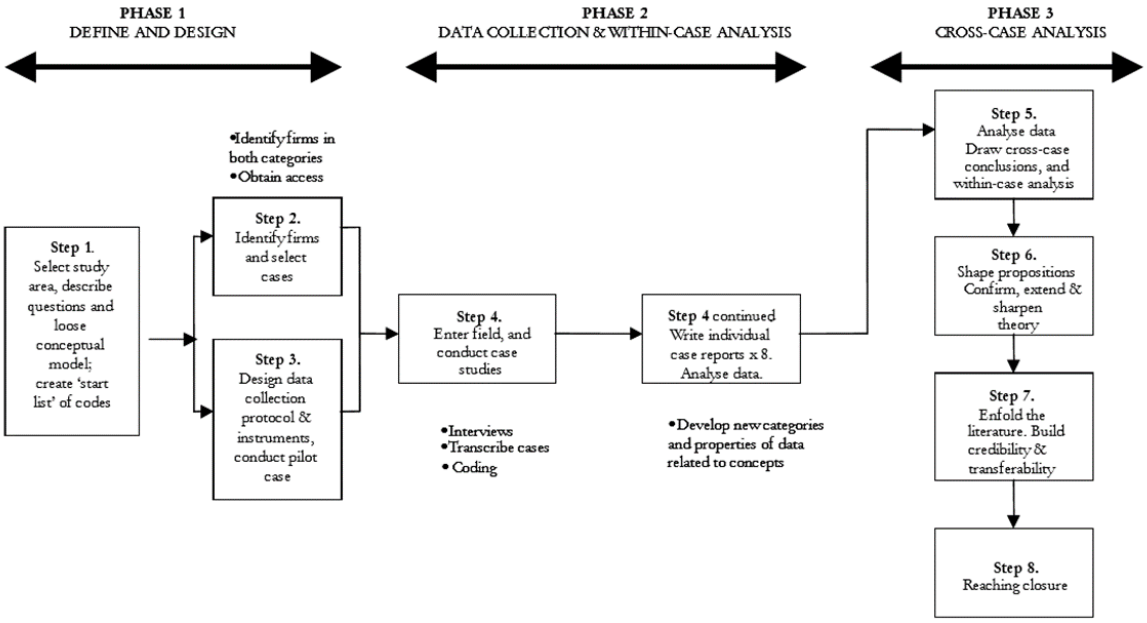
Chapter 4
Research Design

4.1 Theory building from case studies

Piekkari *et al.* (2009) stated that multiple cross-sectional case studies predominate in management research. They are used to build theories that are grounded in holistic empirical evidence (Eisenhardt, 1989; Yin, 2014). These may deliver explanations that are less abstract than theories in *"normal science"* (Eisenhardt, 1989, p. 547), and bring new perspectives to specific research topics. The mainly qualitative case studies presented in this thesis were explanatory rather than exploratory in the sense that no subsequent quantitative hypothesis testing was envisaged (Yin, 2014). The little-researched relationship between managers' ways of implementing an HSMS and their H&S motivations was investigated. The intended outcome was a typology of managers' H&S motivations in their managerial and regulatory context. Individual case studies from fire departments in Germany, the Netherlands and Sweden formed the foundation of the analyses. Eisenhardt (1989) described eight steps for building theory from case studies, which Rowlands (2005) combined into three phases as shown in Figure 4.1.

Figure 4.1

Research plan for building theory from case studies (Rowlands, 2005, p. 88)



Similar to this study, Rowlands (2005) used the approach depicted in Figure 4.1 to investigate managers' views on an activity (in his case, the application of information systems) and their related motivations. The first phase comprised generally defining the research area and identifying participants and data collection methods. The research design should be informed by *"a priori specifications"* (Eisenhardt, 1989, p. 536) that were derived from the literature as theoretical references and means for accurate description of constructs. The corresponding codes for data evaluation in this study are presented in section 4.3. Regarding the second phase, Rowlands (2005) emphasised the importance of combining data collection and within-case analysis by depicting his *"Step 4"*, the fieldwork, twice in the diagram. During investigations at the case organisations, emergent themes and findings should be used to adjust the initially defined specifications (that is, codes) and possibly also the data collection focus (Eisenhardt, 1989). The result of the second phase would be case reports comprising within-case analyses, revealing preliminary theories/concepts in the context of the individual case organisation (Eisenhardt, 1989; Rowlands, 2005).

The cross-case analyses in the third phase should provide explanations from a general perspective. Eisenhardt (1989) suggested developing hypotheses by searching for cross-case patterns. The hypothesised theories/concepts were to be compared with the data. This would result in adjustments to constructs, which in turn would change the theories again. This iterative process was applied to the case data of this study in order to develop constructs and identify relationships between them. Finally, the literature base was considered in order to compare the researcher's own constructs and explanations with rival views of other studies.

In this study, the individual cases of fire departments were integrated into three country cases that reflected national regulatory environments. The number of cases corresponded to the recommendations of Eisenhardt (1989). To reflect national situations, four organisational cases were used per country, resulting in 12 case studies in total. The data could not provide statistical relevance with respect to the manager populations in Germany, the Netherlands and Sweden because the number of participants was too small. Instead, the data were used to qualitatively investigate the relationships among content codes and between codes and the social context (Brinkmann and Kvale, 2015). Within the group of participants, the frequency of motivation statements permitted statistical analysis because several hundred quotes

were identified. Thus, the qualitatively derived motivation codes were quantitatively evaluated to reveal differences within the sample. Overall, the thematic analysis involved reviewing interview transcripts and documents, identifying themes that can be supported by examples and deriving explanations. Burnard *et al.* (2008, pp. 429-430) emphasised:

> *"Interview transcripts, field notes and observations provide a descriptive account of the study, but they do not provide explanations. It is the researcher who has to make sense of the data that have been collected by exploring and interpreting them."*

4.2 Data collection for individual case studies

To develop the individual case studies, multiple data sources were used. The interviews focused on the experiences and views of fire department managers. Additionally, organisational H&S documents and the general context of the fire departments (for example number of full-time firefighters, number of fire stations etc.) were investigated. In creating the country cases, national publications relating to the regulatory environment and H&S practices were also considered.

It was important for data-collection design to consider the criteria for interpreting findings. The criteria were derived from a substantiated literature review because they determined what kind of data would be collected (Eisenhardt, 1989; Yin, 2014). The HSMS model for this study (Figure 2.7) was developed accordingly, providing a reference point for the analysis of organisational HSMSs during fieldwork. The motivations of managers were initially investigated with respect to five codes: legal, economic, information provision/usage, peer pressure and manager performance/reputation (section 4.3). By establishing the HSMS model and the initial codes of H&S motivations, the literature review provided criteria for interpreting the variables of the research question of this study. These criteria for data evaluation were important in conducting the interviews, as Brinkmann and Kvale (2015, p. 157) explained:

> *"If the analysis will involve coding the answers, then during the interview the researcher should continually clarify the meanings of the answers with respect to the categories to be used later."*

Two interviews of about one hour in duration took place at each of the 12 fire departments that participated:

a. Interview with the commander or vice-commander of the fire department
b. Interview with the H&S expert

Interviews were conducted with both the commander (or vice-commander) and an H&S expert of each fire department because the organisational HSMS implementation is likely to be the result of the experiences and motivations that prompted their decisions as managers. Together, these individuals were considered the top management in the field of H&S. The participants were informed before the interviews about the contents and aims of the research project. This also included an introduction to the HSMS model (Figure 2.7). The interviews focused on specific examples of existing risk assessments and/or documented H&S measures from the organisations in order to ensure a practical level of discussion. Due to the phenomenological perspective applied, the interviews centred around real-world topics (Brinkmann and Kvale, 2015). Specific topics (for example documented risk assessments) were selected and agreed upon with the participating fire departments in advance. Interviewees were asked how those H&S topics had been developed, why they acted in that way, and how their decisions were related to their experiences with H&S authorities.

Brinkmann and Kvale (2015) described semi-structured qualitative interviews as a method for identifying a person's experience of a given topic. The interviewer should begin with an open question that requests interviewees to describe a certain experience in their own words. Subsequent questions should then be asked to clarify issues and to maintain the thematic focus. In this study, four leading questions were asked during the interviews with both the commanders and the H&S experts:

1. How is your organisational H&S management system shaped?
2. What are your reasons for choosing such an approach to H&S management?

3. What are your experiences with H&S authorities (insurances, unions, etc.) and their publications?
4. What H&S approaches and motivations do H&S authorities emphasise in your view?

After the framework for the interview had been defined during the introduction (see also section 3.4), the chosen risk assessments or H&S measures, respectively, were discussed with reference to the HSMS model of this study. On this thematic basis, the motivations of the commander and the H&S expert were investigated. Finally, experiences with H&S authorities were considered. During debriefing, the participants were asked if they would like to add anything. The researcher explained that there would be another opportunity for conversation (either in person or by telephone) regarding the draft case study report, which was written by analysing the two completed interviews with respect to the predefined data codes (section 4.3) and by reviewing the general context of the respective fire department. The latter was investigated during a complementary visit to the main local fire station. The review of the draft case study reports by the participants ensured that the researcher's understanding of the reported information was correct, and it provided initial analysis results to the participating organisations.

4.3 Within-case analysis

The views and experiences of the participating fire department managers were the main data source. The interviews were transcribed and then analysed in detail. The QDA software NVivo 11 was used to structure the contents of the comprehensive text data for subsequent cross-case analyses. This helped to systematically derive the outcomes and conclusions of the study. Brinkmann and Kvale (2015) emphasised that transcribing interviews implied considerable interpretation because oral language is translated into written text. In this study, the analysis was based on transcriptions that focused on content rather than verbatim presentation. Thus, following the recommendation of Brinkmann and Kvale (2015), a more fluent written style was applied.

The interviewees' statements were analysed with respect to codes describing the ways of implementing an HSMS (referring to the elements of an effective HSMS according to

Figure 2.7) and the associated motivations of top management. According to Bazeley (2013, p. 128), each code *"provides a label that represents what passages of data are about"*. The interview data were scanned for such codes. When a new issue emerged during an interview, it was discussed in detail to ensure a comprehensive description of this potentially new code. At the same time, it was acknowledged that codes should typically be modified during the process of data analysis (Bazeley, 2013; Brinkmann and Kvale, 2015). In the following, the initial codes from the literature are described.

Motivation codes for managers' reasons for implementing an HSMS:

- Legal: aiming at complying with regulatory demands
- Economic: aiming at creating benefits for the organisation
- Information provision/usage: using information provided by authorities
- Peer pressure: viewing activities of others as challenge
- Manager performance/reputation: viewing H&S as important for one's own performance evaluation or reputation within the organisation or industry
- Other motivations that emerged during interviews, including those social-context items from the literature that were initially considered less important for medium-sized non-profit organisations (for example corporate image or supply chain pressure)

HSMS codes for managers' ways of implementing an HSMS:

- Governance oriented ('Deciding' + 'Innovating')
- Behaviour oriented ('Leading' + 'Taking care')
- 'Deciding' + 'Taking care'
- 'Leading' + 'Innovating'
- Holistic system (all four elements of an effective HSMS)
- Other HSMS approaches that did not correspond with the literature review, including isolated HSMS elements or combinations of three HSMS elements according to Figure 2.7.

The above codes were not described abstractly, but rather in a very practical way. This approach mitigated potential problems resulting from language interpretation or intercultural understanding (Bazeley, 2013). The interviews with Dutch and Swedish participants were conducted in English, occasionally supported by the author's

knowledge of the local languages. The use of English was possible because the participating interviewees spoke the language at a satisfactory level. Among German participants, knowledge of the English language was insufficient. Therefore, the interviews at German fire departments were conducted and transcribed in German. The relevant parts of the transcripts were subsequently translated into English. The effects of divergent language interpretations between the researcher and Dutch or Swedish interviewees was expected to be minor because of the practical interview focus. The researcher aspired to further reduce potential language effects by asking clarifying questions during the interviews, as recommended by Brinkmann and Kvale (2015).

The within-case analysis focused on identifying thematic statements from the interviews. These represented the interviewees' viewpoints as understood by the researcher (Brinkmann and Kvale, 2015). Such statements made participants' experiences and management approaches as well as their motivations visible. They comprised the ideas and concepts of H&S management that formed the basis for the analyses and outcomes of the cross-case analyses.

4.4 Cross-case analyses

The ideas and concepts that resulted from the within-case analyses were compared in order to identify cross-case patterns (Eisenhardt, 1989) and explore interrelationships and effects of context (Bazeley, 2013). In terms of managers' H&S motivations, open coding was used to develop categories that *"capture the fullness of the experiences"* (Brinkmann and Kvale, 2015, p. 227). This enabled the creation of a typology that reflected managers' views on the issue (Bazeley, 2013). The identified motivation statements were related to the ways of implementing an HSMS. Additionally, managers' experiences with H&S authorities were reviewed. The relevance of specific motivation categories was analysed by counting and statistically evaluating the number of respective statements. It was investigated whether different H&S motivations led to different management practices in different regulatory environments. Emerging patterns were scrutinised with a view to the literature on HSMS implementation.

Eisenhardt (1989, p. 536) stated that the analysis should start *"as close as possible to the ideal of no theory under consideration and no hypotheses to test"*. She conceded,

however, that this ideal could not fully be achieved. Therefore, she recommended that only the main variables, and not comprehensive theoretical propositions, should be derived from the literature. In this study, the initial codes for managers' motivations and ways of implementing an HSMS were based on the literature. The patterns that emerged during the data analyses were used to move from the initial motivation codes to the elaborated typology of managers' H&S motivations, taking relationships with regulatory experiences and managerial practices into account. Regarding these relationships, no substantiated propositions were derived from the literature; only basic ideas were developed. For example, economic pressure might promote informal rather than formal HSMSs (Nordlöf, 2015; Yang, 2012).

To investigate the effects of regulatory approaches in Germany, the Netherlands and Sweden, the individual case studies were combined to form country cases. The literature review and the expert consultations (section 5.1) indicated that the regulatory environments within these countries could be assumed to be similar. These country cases were supported by national documentation and literature on the activities of H&S authorities, such as government agencies, insurances, trade unions etc. Emerging patterns were scrutinised with a view to the literature on H&S regulation.
With reference to the typology of managers' H&S motivations in their managerial and regulatory context, it was investigated whether the data provided answers as to why certain motivations led to certain H&S management practices and why these motivations were differently affected by authorities. By considering the literature on these questions, reasons for and against generalisation were identified (Yin, 2014). At the same time, the internal validity of the results was supported (Brinkmann and Kvale, 2015). There was no expectation of finding a complete answer to the question of why those relationships existed. Indeed, it was important to avoid creating a *"narrow and idiosyncratic theory"* (Eisenhardt, 1989, p. 547) that would have been applicable to only the very specific context of fire departments in the selected countries.
Accordingly, the theoretical considerations were not used to develop a complex proposition about why relationships between motivations, regulations and management practices existed. Instead, the analyses were aimed at verifying and supporting the generalisability of the developed typology of managers' H&S motivations.

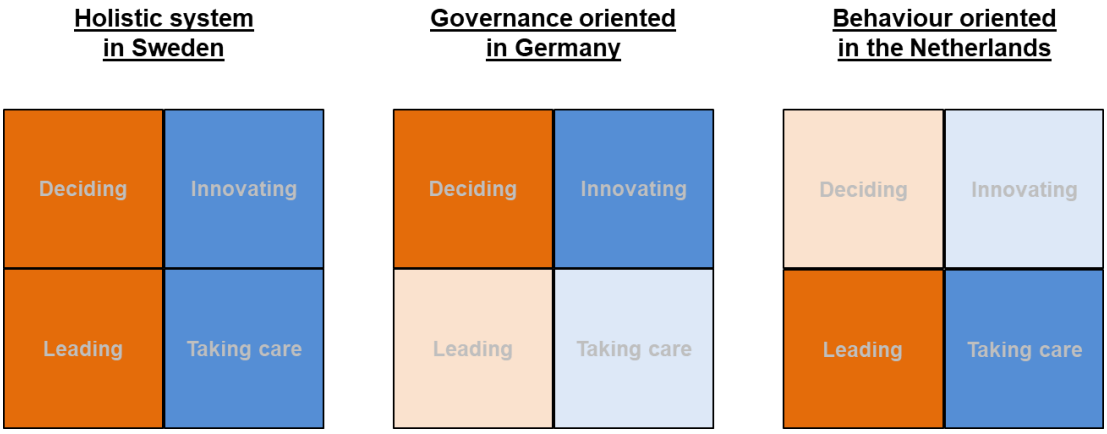
4.5 Sampling of fire departments in Germany, the Netherlands and Sweden

The selection process for participants was a combination of theoretical and convenience sampling. The theoretical reasoning for choosing fire departments is described in section 1.3. In the selected countries, there is a suitable number of medium-sized professional brigades (with 50 to 300 full-time firefighters). These municipal organisations are free in decision making, which distinguishes them from their counterparts in countries with regional or national fire services, such as France or Poland. The fire departments were approached by letter and email to ask if they would participate. The term 'convenience sampling' refers to the limited willingness of fire departments to take part. In each country, at least five organisations were interested in participating. Geographic selection resulted in a regional diversity covering three federal states in Germany, four provinces in the Netherlands and three provinces in Sweden. In total, 15 fire departments were examined, of which two served as pilot studies, one was excluded because of its unusual context and 12 provided the data of the main study. Obviously, the sample of case organisations was biased towards fire department managers that cared about H&S management. However, with respect to the given research question, this was not considered to be problematic because the study investigated how (not whether) an organisational HSMS was implemented.

During the sampling process, Figure 4.2 was used for promotion purposes. The figure was developed as an indicative visualisation of the different ways of implementing an HSMS in Germany, the Netherlands and Sweden. It was based on selected literature from the respective countries. National publications about H&S practices in fire departments indicated that Germans focused on formal, governance-oriented HSMSs (Gerhold, 2012), while the Dutch fire service association promoted a safety-culture approach (van Guldener, 2013). In Sweden, a holistic approach that integrates both governance and behaviour orientation was described by Alavaara (2007). Figure 4.2 illustrates these findings with dark colours for the focus areas of national HSMS approaches and light colours for the non-focus areas. Based on the literature review, it was not possible to determine whether the depicted differences existed in practice or whether they merely reflected the selected publications. This investigation was part of the data analyses of this study.

Figure 4.2

Assumed national ways of implementing an HSMS at fire departments (developed by the author)



Other European countries were considered not suitable for this study because either the organisational structure of fire services was not comparable or the number of organisations was very small. In the United Kingdom and France, fire departments are organised at regional level. Romania and Poland have national firefighting organisations. In Austria and Belgium, fire brigades are run by municipalities, but there are less than ten professional organisations in each of these countries due to their relatively small size. In Denmark, a single private enterprise is responsible for the majority of fire services.

4.6 Consideration of potential problems and risks during data collection

Darke *et al.* (1998, p. 281) described the accessibility of sample companies as a major issue in case study research and emphasised:

> *"Organizations need to be very clear about the research outcomes and how their organization will benefit from involvement. The researcher needs to work with the organization to identify 'what's in it for them'."*

The research design of this study took into account that there should be some kind of immediate benefit to the fire departments. Therefore, the drafted case study reports were discussed with participants not only to ensure validity, but also to provide the

organisations with initial analytical results. In addition to the individual case analyses, which focused on the local ways of implementing an HSMS, the researcher provided general background information from his fieldwork. Thus, participating organisations received an early benefit in the form of new H&S ideas. Finally, the main findings of the study were summarised and provided in generalised form to protect confidentiality.

The multiple-case design was expected to further reduce the data collection risks of this study. If individual organisations had decided to end their cooperation, there would have been alternative fire departments to contact as alternative participants. More than 20 suitable organisations were identified in both the Netherlands and Sweden, and more than 50 in Germany. Therefore, it was considered likely that the planned number of case studies could be performed in each country.

Chapter 5
Pilot Studies and Resulting Approach to Data Analysis

The process of qualitative data collection allows the interview design to be continually adjusted to account for new insights obtained from completed cases (Eisenhardt, 1989; van Teijlingen and Hundley, 2001). The data are collected *"socially in the interaction of interviewer and interviewee"* (Brinkmann and Kvale, 2015, p. 71). For example, Beck (2011) reported that, in his qualitative study on H&S management, a leading interview question was edited after experiencing problems in early interviews. Unlike in quantitative surveys, such adjustments are considered suitable in qualitative, interview-oriented research because of the overlap of data collection and analysis (Brinkmann and Kvale, 2015; Eisenhardt, 1989). Nevertheless, the design of the semi-structured interviews was well tested by means of expert reviews and two pilot studies, providing the basis for developing the applied approach to data analysis.

5.1 Development of interview design

According to Elo *et al.* (2014), interview questions should initially be developed in association with a relevant reference group in order to ensure the questions are understandable and relevant to the participants. Such expert reviews were also used by other authors in developing questions on managers' experiences and perceptions (Lampinen *et al.*, 2015). During the development of this study's interview design, conversations took place with representatives of Dutch, German and Swedish fire services. The conversations had two objectives. First, fire departments were to be persuaded to participate in the project; this would require support from opinion leaders in the respective countries. Second, the HSMS model and the interview questions were discussed and adapted to align with the needs and perceptions of fire departments. The initial interview guidance (Appendix A) was developed after meetings with one particularly interested H&S expert from each of the three countries. The refined interview guidance (Appendix B) emerged from two subsequent group discussions, one with commanding officers of German fire departments (representing one very small fire department and one very big one, neither of which was subsequently used as a case study), and one with H&S specialists from a Dutch firefighting research institute.

The expert reviews led to the following design adjustments:

- The context of the interviews was re-focused by relating them to existing examples of risk assessments and/or H&S measures in the participating organisations. In this way, a practical level of discussion could be ensured.
- The content of the HSMS model (Figure 2.7) was clarified by changing the explanations of the categories 'deciding' and 'taking care'. In the former category, the words 'in details' were added to confirm that the focus was not just on management interest in general but on detailed H&S decisions. In the latter category, 'informing management' was added in order to distinguish the action from communication among employees.
- The term 'H&S authorities' was clarified for interview question three, stating that not only government agencies were included but also insurances and unions. This was necessary because the different roles of these authorities became obvious during the expert consultations.
- It was stressed that managers' experiences with H&S authorities were not confined solely to personal meetings or inspections, but also included publications and information from the authorities. This was necessary because certain managers in Germany had never experienced a visit from authorities.

In line with the recommendations of Elo *et al.* (2014), the research instrument was considered to have been pretested for appropriateness, comprehension and relevance. Thus, the interviews were expected to produce meaningful data for the subsequent thematic analysis. Both the leading questions and the related HSMS model (Figure 2.7) were tested before the pilot studies, as the interviews were the main source of data. It was investigated how interviewees understood the questions in the given interview context. Collins (2003, p. 231) emphasised:

> *"Whilst pilots may detect overt problems that disrupt the response elicitation process they often do not provide evidence of causes, nor do they provide evidence of covert problems."*

Therefore, it was necessary to look at the relationship between questions and answers first. The wording of the questions and the interview context were reviewed without

considering the specific H&S issues in individual organisations. The focus was on the details of the research instrument, not the data collection method as a whole. The pilot studies subsequently demonstrated that the two interviews with representatives of top management yielded the data required for further analysis.

5.2 First pilot study

The first pilot study was completed in order to demonstrate that the chosen research design would yield the data needed to answer the research question (section 2.8). As a result of the expert reviews described in section 5.1, the main objectives of piloting in case study research, as stated by Yin (2014), had already been achieved. The data collection method had been adapted with respect to both content and field procedures. However, it had yet to be shown that the individual case studies would provide meaningful results and sufficient data for subsequent cross-case analysis. According to the research objectives (section 2.8), managers' ways of implementing an organisational HSMS, their H&S motivations and their perceptions of H&S authorities' regulatory approaches had to be codified. The within-case analysis was expected to reveal indicative relationships between management practices and underlying motivations.

5.2.1 Research design

The first pilot study was conducted at a Dutch fire department. The organisation comprised about 200 professional firefighters at five stations. It was one of the bigger fire departments in the Netherlands. Interviews were conducted with the vice-commander and the H&S expert. The interview guidance as presented in Appendix B was applied. In order to ensure confidentiality, the organisation was referred to as NL-1, and names of individuals and locations were omitted in the case study report (Appendix C).

Two examples of H&S management activities were discussed at NL-1:

a) Draft of guidelines for 'Schoon werken bij brand' ['clean working at fire']
b) Draft of 'RI&E proces' ['process for risk assessments']

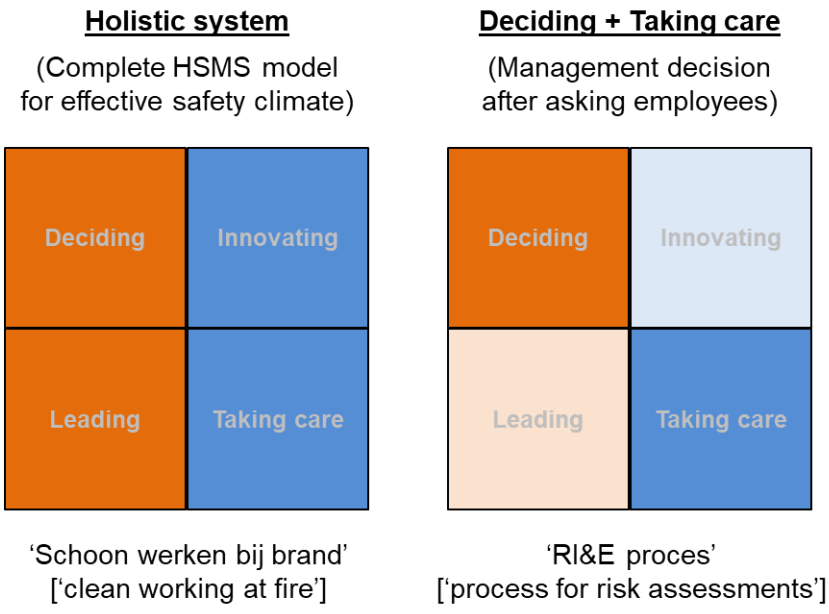
Two related documents were provided to the researcher in advance, allowing for preparation of the interviews. Additionally, a TV report about the issue of 'Schoon werken bij brand' ['clean working at fire'] was found on the internet. This was well known by pilot study participants and it became part of the interview with the H&S expert. The documents were discussed with respect to the leading interview questions in the interview guidance (Appendix B). Based on the interviews and related documents, the researcher drafted a case study report that was provided to both interviewees for review. The text was then edited based on the feedback received, resulting in the final report as presented in Appendix C.

5.2.2 Case analysis

With respect to the considered examples of H&S management at the Dutch fire department NL-1, two different ways of implementing an HSMS were identified. As shown in Figure 5.1, a 'holistic system' was in place for the issue of 'Schoon werken bij brand' ['clean working at fire'], while the regular 'RI&E proces' ['process for risk assessments'] comprised only two of the four elements of an effective HSMS, namely 'deciding' and 'taking care'. The underlying analysis is described in detail in the case study report (Appendix C).

Figure 5.1

Way of implementing an HSMS at fire department NL-1 (developed by the author)



The case study of NL-1 indicated that different ways of implementing an HSMS may coexist in an organisation. A 'holistic system' was identified for the 'clean working at fire' guideline, which referred to reducing the risk of cancer among firefighters. This issue was brought up by firefighters in 2015 and received considerable media attention. Firefighters had been developing their own H&S measures in the workplace even before top management considered the issue in detail. As a result, there was an innovation process with no formal organisational rules or governance. However, top management enabled this development by supporting and rewarding communication about the issue. As the whole organisation was dealing with the topic to some extent, the interviewees mentioned risk awareness at all levels of their fire department.

In contrast, the 'process for risk assessments' was rather theoretical in nature. Its practical relevance was less clear, making it more difficult to create awareness through leadership. The resulting H&S measures were hardly considered in day-to-day business or training, which prevented innovation. The process at NL-1 reflected legal demands. Nevertheless, NL-1 was trying to improve this way of implementing an HSMS. Top management reported that they had discussed H&S innovation processes and related problems with the authorities. The interviewees stated that the 'Inspectie SZW' ['Inspectorate SZW', an agency of the Ministry of Social Affairs and Employment] took a somewhat holistic view of H&S management, but that inspectors focused too much on detailed rules.

Top management stated different motivations with regard to the two ways of implementing an HSMS. In terms of 'clean working at fire', they had to respond to the activities of their employees and wanted to give direction to the discussion. Their main motivations were ensuring credibility and controlling emotions. Other motivations mentioned included avoiding overreactions and panic. The vice-commander of NL-1 (interview, #00:16:20) stated:

> *"Of course, there are limits, sure, but on the other hand when you say we are an organisation that goes for safety and for health – that's what we do outside – then we also have to do that for our own employees…*
> *To give direction to the emotions [and] to the awareness, that's what we do by leading."*

The H&S expert added that the related TV report of September 2015 created another motivation for the top management of NL-1. In that programme, the commander, who was responsible for H&S at the national association 'Brandweer Nederland', answered the journalist's questions very openly and convincingly. He was a member of the association's standing committee of commanders in which also NL-1 was represented. The H&S expert from NL-1 stated (interview, #00:41:45):

> *"The one commander you saw on TV; he felt a lot of responsibility; he felt a lot of ownership… and he convinced his colleagues in top management [at 'Brandweer Nederland']."*

Regarding management motivations for the 'holistic system', two codes of section 4.3 might therefore be applied, and avoiding panic might provide an additional code:

- 'Manager performance/reputation' (based on statements by the vice-commander)
- 'Peer pressure' (based on statements by the H&S expert)
- 'Avoid panic' (new people-focused code, based on statement by vice-commander)

The 'RI&E proces' ['process for risk assessments'] was described as a less effective way of implementing an HSMS, covering only 'deciding' and 'taking care'. Both interviewees stated that the contents of the risk assessments were often not very relevant to the work of firefighters. The vice-commander emphasised that, in reality, *"you have to make priorities"* (interview, #00:25:40), although inspectors might identify items of non-compliance when checking their lists of predefined risks and recommended measures. The within-case analysis indicated that differences between work practices and written risk assessments were caused by the following motivation for the 'RI&E proces':

- 'Legal' (based on statements by both the vice-commander and the H&S expert)

The analysis of the ways of implementing an HSMS and the associated motivation statements in the interview transcripts provided a first indication of corresponding

relationships. The motivation of legal compliance resulted in a less effective way of implementing an HSMS than other motivational factors, such as management reputation and peer pressure. As described by Guldenmund (2010, p. 1477), legal compliance *"was not the final goal"*, but other motivations led to the 'holistic system' of H&S management at NL-1. This was a first hint for the development of the envisaged typology of managers' H&S motivations.

5.2.3 Conclusions

The two interviews, the site visit and the H&S documents considered proved to be suitable sources for developing the case study. The corresponding report (Appendix C) was reviewed by the participants. Their feedback revealed that the presentation of the different ways of implementing an HSMS was meaningful, and that the description of main managerial motivations and regulatory experiences was valid. The approach applied to ensure confidentiality worked well. Neither the case study report nor the quotes from the interview transcripts contained any names or identifying characteristics. The list of associated names was treated as a strictly confidential document. The research approach was well received by the participants.

The researcher's knowledge of the local language was important for data collection. During interview transcription, many Dutch words had to be captured and translated. Additionally, the interviews were partially influenced by a Dutch interpretation of English. For example, the English term 'governance' was initially associated with the government officials of the municipalities. As anticipated in the research design, it was necessary to clarify such terms during the interviews. The considered H&S documents from the fire department and the H&S authority were also written in Dutch.

During case analysis, the difference between fixed and open codes became evident. The four elements of an effective HSMS (Figure 2.7) represented fixed codes that had been well defined in advance, referring to both the literature and experts. They were used to describe the ways of implementing an organisational HSMS. Following Brinkmann and Kvale (2015), this fixed coding was done during the interviews, allowing for clarifying discussions between the interviewees and the researcher. In contrast, the researcher completed a self-contained transcript analysis of managers' H&S motivations. A

variety of motivation statements were identified during the process of open coding. Obvious views were included as main motivations in the case report. All motivation statements were marked in the transcript for subsequent cross-case analysis (examples in Appendix D). Overall, the answers of the interviewees contained promising statements that could be expected to provide new insights when compared with data from other cases.

This pilot case study revealed that authorities tended to expect uniform national approaches to H&S management. A major inspection of fire departments in the Netherlands in 2015 by the H&S authority 'Inspectie SZW' ['Inspectorate SZW', an agency of the Ministry of Social Affairs and Employment] was discussed. The authority investigated 19 of the 25 fire departments in the country. The results indicated that all 19 of the organisations failed to have valid risk assessments for operations. Among other things, the authority recommended harmonising H&S approaches across the Netherlands in order to improve H&S conditions. Accordingly, it might be expected that all Dutch fire departments would report similar experiences with H&S authorities in the main study. This supports the idea, and value, of developing country-specific cases.

In summary, the experiences from the first pilot case study demonstrated that the developed research design worked well. The within-case analysis resulted in a case study report (Appendix C) that was well received by the participating organisation. As anticipated during research design, it was possible to derive first ideas about the relationship between managers' H&S motivations and their ways of implementing an HSMS. The resulting case study report and the interview transcripts were considered a suitable data source for the subsequent cross-case analysis.

5.3 Second pilot study

The aim of the second pilot study was to demonstrate the reliability of data collection. The first pilot study had revealed a substantial difference in the coding process for the two main variables under investigation: fixed codes for the ways of implementing an HSMS versus open codes for H&S motivations. With the second pilot study, it was examined whether this differential coding process was appropriate. In contrast to the first pilot study, the fixed model of an effective HSMS (Figure 2.7) was not explained to

participants during the interviews of the second pilot study. Only the questions in the interview guidance according to Appendix B were presented in oral and written form. This change to the interview design was expected to affect the course of the interview conversation, potentially resulting in different data collection outcomes.

The first pilot study had provided the following experiences with respect to the two main variables of the research question:

- First variable: Managers' ways of implementing an HSMS
  The four elements of an effective HSMS (Figure 2.7) served as a fixed-coding framework. The codes were deductively developed from the literature and sufficiently pre-tested for relevance during expert reviews (section 5.1). In the beginning of the interviews in the first pilot study, the codes were explained to the participants and Figure 2.7 was on the table for reference during the interviews. Following Brinkmann and Kvale (2015), this approach allowed for clarifying discussions regarding the elements of an effective HSMS. As a result, the interview design of the first pilot study was expected to clearly reveal different ways of implementing an HSMS (Figure 5.1).

- Second variable: Managers' H&S motivations
  Managers' motivations for engaging in H&S management were identified with an open coding process. Not only statements that fit into the motivation codes derived from the literature (section 4.3) were considered: also new items, such as *"avoid panic"* (interview with the vice-commander of NL-1, #00:11:15), were coded as motivation statements. Following Rowlands (2005), emergent themes and findings from within-case analysis should be used to amend the initially defined codes for subsequent data collection and analysis. Correspondingly, the first pilot study provided indications of H&S motivations, but no definite motivation categories or themes.

Based on the literature review, it was assumed that top managers' H&S motivations (second variable) determined their ways of implementing an HSMS (first variable). The open coding of H&S motivations corresponded with the little existing knowledge in the field. The fixed codes for the ways of implementing an HSMS reflected the comprehensive literature on safety climate.

5.3.1 Research design

The second pilot study was conducted at a German fire department. The organisation comprised about 100 professional firefighters at one station. It was one of the smaller professional fire departments in Germany. Interviews were conducted with the vice-commander and the H&S expert. In order to ensure confidentiality, the organisation is referred to as D-1. The interviews were conducted and transcribed in German. Subsequently, relevant parts of the transcript were translated into English (Appendix D).

The interview guidance as presented in Appendix B was applied, but without showing the elements of an effective HSMS (Figure 2.7). In contrast to the first pilot study, the interviews did not start with describing the model to the participants. Only the four leading questions were introduced. Then it was explained that, in this study, the term 'HSMS' refers to both informal behaviours and formally documented structures and processes. During the interviews, reference to the 'basic model of health and safety management systems' (Appendix B), that is, the elements of an effective HSMS according to Figure 2.7, was avoided. The sub-codes of the four elements were not used in clarifying or probing questions in order to prevent a hidden, implicit application of the pre-defined fixed codes. There was thus no common theoretical framework for the interview conversations on the ways of implementing an HSMS, leaving the interviewees to present their views freely. Regarding managers' H&S motivations, as in the first pilot study, there was an open conversation with subsequent application of open codes.

Four examples of H&S management activities were discussed at D-1:

a) Risk assessment and risk mitigation at driving to emergency responses
b) Employee information at introduction of new vehicles
c) Formal instruction for refilling AdBlue on diesel vehicles
d) Introduction of 'Remove-before-smoke-diving badge' for team registration

The examples were considered with respect to the leading questions in the interview guidance (Appendix B). The last example d) was considered in the greatest detail because it was directly related to the day-to-day work of firefighters, and its relevance for H&S was obvious. At the same time, its operational nature was similar to that of the

‘Schoon werken bij brand’ [‘clean working at fire’] example from the first pilot study because both practices were applied during indoor firefighting. Thus, a basis was created for comparing the outcomes of the different interview designs in the two pilot studies.

5.3.2 Case analysis

The case analysis of the second pilot study focused on the comparison of the data collection outcomes with those of the first pilot study. Therefore, the two practices from indoor firefighting were taken as examples of H&S management at the organisations NL-1 and D-1, that is, ‘clean working at fires’ and the introduction of a ‘Remove-before-smoke-diving badge’. For both H&S management cases, a ‘holistic system’ of HSMS implementation was identified. The corresponding interview answers from the vice-commanders of the two fire departments are presented in the following. The first interviewee knew the elements of an effective HSMS according to Figure 2.7 when he gave his answers. The second participant described the ‘holistic system’ without this knowledge. The comparison of interview answers was expected to reveal potential differences in data collection outcomes and thus provide an indication of reliability. At the same time, the occurrence of motivational statements during the course of the interviews was considered.

The vice-commanders of both NL-1 and D-1 described a ‘holistic system’ of HSMS implementation. The following is a list of the interview statements that were coded according to Figure 2.7:

<u>Statements of vice-commander NL-1 on the ‘holistic system’ for clean working at fire</u>

- Deciding: *“we decided to start up a task force [sic]”* (interview, #00:08:00).
- Innovating: *“[name of H&S expert] has told you probably all about it. We are innovating”* (interview, #00:14:20), supported by a separate statement by the H&S expert: *“during the process, they [the firefighters] worked together with me and with higher management to get some extra funding. After the first steps, we tried to get some innovation in the way”* (interview with H&S expert, #00:28:10).

- Leading: *"we have to bring back reason in what we have to do"* (interview, #00:11:35) and *"To give direction to the emotions, to the awareness, that's what we do by leading"* (interview, #00:17:25).
- Taking care: *"firemen, the basis of our organisation, start worrying about their health according to cancer, according to smoke, according to all the stuff that comes out of a fire [sic]"* (interview, #00:07:15).

Statements of vice-commander D-1 on the 'holistic system' for smoke-diving registration

- Deciding: *"And then we said that we could, actually…, we make a Remove-before-smoke-diving badge, which is fitted with Velcro to the jacket"* (interview, #00:44:00).
- Innovating: *"And then we also asked the team what other problems does smoke-diving monitoring create for us. If it rains, then, sorry, the pen doesn't write. How do we get the pen to write? Then we looked for paper which is not destructible… and got a pen, the famous NASA pen"* (interview, #00:45:30).
- Leading: *"We said, listen people, there were two serious smoke diving accidents. We've examined them. We'll describe the accidents to you. And at the same time, we'll describe the lessons we learned from them to you. And then we offered a training session"* (interview, #00:46:45), and *"encouraging the people very clearly in their responsibility. Taking responsibility. Making decisions themselves"* (interview, #00:49:30).
- Taking care: *"he [the firefighter] must evaluate, can I take the responsibility for taking a measure now, which maybe isn't the standard measure but can remedy things here. If I [fireman] can't, I [fireman] must pull back and provide feedback… And the employees must be sensitized to realise: So, now I'm at my wits' end and I need support in making a decision"* (interview, #00:53:40).

When comparing the interview statements about the ways of implementing an HSMS, it became obvious that in the first pilot study, the vice-commander of NL-1 used the terms applied in Figure 2.7, while the answers in the second pilot study were more general. Nevertheless, also the latter statements permitted coding according to the pre-defined and tested codes. Thus, both pilot studies revealed that the fixed codes for top managers' ways of implementing an HSMS worked well. However, during the first pilot study, suggestions emerged for amending the sub-codes in Figure 2.7. For

example, the vice-commander added the term *"emotions"* to clarify his understanding of leadership, supplementing the given sub-code of awareness. Similarly, the H&S expert suggested amending the 'innovating' by replacing 'assessment of hazards' with 'assessment of measures' (Appendix C). Thus, the comparison of answers indicated that richer data were gathered in the first pilot study because participants were introduced to the HSMS model according to Figure 2.7.

All interviews indicated that the course of the conversation was supported by staying focused on specific examples. During both the first and the second pilot study, interviewees tended to move to other fields of their H&S activities when they wanted to show good performance. For example, the vice-commander of NL-1 mentioned *"general annual presentations"* when he wanted to emphasise his leadership (interview, #00:17:50). Similarly, the vice-commander of D-1 mentioned *"ambulance services"* when he wanted to explain that employees had to decide independently (interview, #00:50:40). In both cases, the pre-agreed examples were used to bring the interview conversation back to the original topic in order ensure that the ways of implementing an HSMS were correctly described.

Interviewees stated their H&S motivations when describing their ways of implementing an HSMS. There were no separate conversations about the first two questions in the interview guidance but the shaping of the HSMS and the underlying motivations were considered together. The two pilot studies indicated that rather diverse statements could be expected in the main study. These were used for an inductive development of themes for managers' H&S motivations in the different regulatory environments. In contrast to the HSMS codes in Figure 2.7, the motivation codes that were derived from the literature in section 4.3 did not cover all answers. New themes emerged in both pilot studies in relation to the implementation of a 'holistic system'. For example, the vice-commander of NL-1 mentioned *"avoid panic"* (interview with vice-commander of NL-1, #00:11:20) and the vice-commander of D-1 stated *"we also wrote an article… that was then publicised"* (interview with vice-commander of D-1, #00:47:00). Thus, both pilot studies demonstrated that an open coding approach was necessary for analysing the data on top managers' H&S motivations.

5.3.3 Conclusions

The comparison of the data collection outcomes in the first and second pilot studies indicated that the differences were rather small. The analysis of the interviews with the vice-commanders of the NL-1 and D-1 fire departments also revealed that the courses of the conversations were similar. With respect to the ways of implementing an HSMS, it was observed that the first pilot study resulted in richer data. After introducing the fixed-coding scheme according to Figure 2.7, interviewees' answers were more focused and provided indications for improved sub-codes for the elements of an effective HSMS.

Brinkmann and Kvale (2015) stated that discussing fixed codes during an interview could increase the accuracy of coding because the interviewees could be asked about their understanding in detail. McCafferty (2013) also applied deductively developed fixed codes to describe organisational behaviour with respect to a pre-defined model. For her qualitative interviews, she developed probing questions that were related to the factors of that model. According to McCafferty (2013, p. 90), such an approach *"makes explicit the reality that researchers are contaminated with theory"*. However, it might also be considered an inappropriate way of leading interviewees' answers in a specific direction. To take both of these views into account, the fixed codes in this study were explained to participants in the beginning of the interviews. The interviewees, who were generally educated in the field of H&S management, were thus able to understand and judge the interview questions in the context of Figure 2.7. By openly discussing the fixed codes in the first pilot study, the researcher's influence on the outcome of the coding process was therefore expected to be smaller than in the second pilot study. During the interviews in the first pilot study, Figure 2.7 was continuously on the table in order to ensure that all elements of an HSMS were considered.

The open coding of top managers' H&S motivations and the investigation of the relationship with their ways of implementing an HSMS followed the recommendation of Eisenhardt (1989, p. 536), who stated that the analysis should start *"as close as possible to the ideal of no theory under consideration and no hypotheses to test"*. With respect to the relationship between managers' H&S motivations (second variable) and their ways of implementing an HSMS (first variable), some indications and ideas could be derived from the literature, requiring an inductive approach to data analysis. The

corresponding open coding process started during within-case analyses and was envisaged to be completed during cross-case analyses.

The review of the interview design during the two pilot studies showed that the setup represented a form of critical incident analysis as described by Stysko-Kunkowska (2014, p. 99):

> *"Participant reconstructs an incident or set of incidents (events, processes, issues) of particular meaning for him and delivers information about the personal meaning, beliefs, emotions, behaviours, context and outcomes."*

In this context, the term 'critical' did not refer to notions of crises or problems, but meant management situations that were *"prominent in the memories"* of participants (Cope and Watts, 2000, p. 112). The pilot studies indicated that top management representatives of fire departments had many stories to tell about their ways of implementing an HSMS. To ensure that participants had a common understanding of the HSMS characteristics, the elements of an effective HSMS (Figure 2.7) were presented in the first pilot study. Cottrell (2013) used a similar approach when mentioning a list of stakeholders that interviewees should consider when reporting critical incidents. Thus, a deductively developed framework was provided that resulted in comparable stories about organisational examples of H&S management. Related H&S motivations of managers were then revealed inductively, pursuing a phenomenological approach as described by Brinkmann and Kvale (2015).

5.4 Resulting approach to thematic data analysis

Qualitative coding formed the basis of the thematic data analysis in the first and second pilot studies. The validity and reliability of the applied codes was essential to ensure the correct conclusions were drawn (Campbell *et al.*, 2013). The relationship between the two variables of this study's research question could only be investigated correctly if the codes described what they were supposed to describe (validity), and if the coding was done so consistently that other researchers would have done it in a similar way (reliability). The coding of the semi-structured qualitative interviews was relatively

complex because the transcripts were, as is typical for this research instrument, *"conversational and choppy"* (Campbell *et al.*, 2013, p. 302). The open-ended questions tended to produce broad answers that were developed as the interviewer and the interviewee *"negotiate[d] an understanding"* (McPhee, 1990, p. 399) of the topics. The researcher influenced what kinds of incidents were discussed and to what extent, as described in the second pilot study. Due to the complexity of the transcripts, varying coding approaches had to be applied in order to ensure validity and reliability.

There is little literature on how to code semi-structured interviews (Campbell *et al.*, 2013). In line with the pragmatic research paradigm of this study, the researcher varied between deductive and inductive coding. The pilot studies indicated that the first variable of the research question, that is, top managers' ways of implementing an HSMS, could be coded well with the deductively derived framework according to Figure 2.7. The fixed-coding scheme structured the interviews and produced data based on consistent codes. The validity was tested during the interviews by discussing the coding with the interviewees, that is, pursuing a process of *"member checking"* (Saldaña, 2009, p. 28) as demonstrated in the first pilot study. The emergent themes of HSMS implementation were reflected in analytical memos that were written after the interviews at each case organisation.

The second variable of the research question had to be investigated using open codes because there was little literature on top managers' H&S motivations. Thus, the coding had an exploratory character. In-vivo coding was applied because the study aimed to investigate the motivations of managers from the individuals' perspectives. Statements of interviewees on their H&S motivations were identified in the transcripts, not coding line-by-line, but applying codes with less frequency, as suggested by Saldaña (2009). Motivational codes and associated categories were inductively developed by quoting notable interviewee statements. The analysis of motivations started with participants' original expressions (that is, with in-vivo codes) to ensure reliability and validity.

Descriptive coding was used to identify organisational and regulatory explanations in the transcripts. The organisational codes were interrelated with the individual ways of implementing an HSMS, making the coding process similar to that for motivation statements. Regulatory contexts, in contrast, were typically described separately, as answers to the third and fourth interview questions (Appendix B), yielding

corresponding passages in the transcripts that could be marked as ‘regulatory’. The contents of the codes were then reviewed and compared with statements in related interviews. The resulting organisational and regulatory views were triangulated with the literature, organisational reports and publications of the H&S authorities in Germany, the Netherlands and Sweden.

The pilot studies delivered on the envisaged structure of the data analysis according to the research objectives described in Chapter 2. In the main study, top managers’ ways of implementing an HSMS were initially identified based on within-case analyses, taking organisational contexts into account. The subsequent cross-case analyses comprised both the identified managerial practices and regulatory contexts. Country cases were developed with respect to interviewees’ perceptions of authorities’ regulatory approaches. Subsequently, managers’ H&S motivations were codified and related to the previously identified ways of implementing an HSMS and national regulatory contexts. Finally, the envisaged typology of managers’ H&S motivations in their managerial and regulatory context was developed. Accordingly, the presentation of the data analysis is separated into three chapters:

- Chapter 6: Individual Ways of Implementing an HSMS in Varying Contexts (Within-Case Analysis)
- Chapter 7: Integrated Ways of Implementing an HSMS under National Regulations
  (First Cross-Case Analysis)
- Chapter 8: Typology of Managers’ H&S Motivations
  (Second Cross-Case Analysis)

The chapters’ titles represent the different approaches to case analysis and comparison as pursued in this study. The within-case analysis was the starting point, as is typical for theory building from cases (Rowlands, 2005). The pilot studies indicated that there were several examples of different ways of implementing an HSMS in each organisation. In total, six examples of H&S management were discussed in the pilot studies. Thus, about 36 examples were expected for the main study with 12 participating organisations. The organisational background was expected to be similar in the case studies, as the sample was limited to municipal fire departments with 50 to 300 full-time professional firefighters (section 4.5). It was reviewed for each case

whether there were unusual organisational characteristics. The within-case analysis resulted in a list of examples of H&S management practices.

A cross-case view was taken in order to group the ways of implementing an HSMS, to describe national regulatory environments and, finally, to develop the envisaged typology of managers' H&S motivations. According to McPhee (1990, pp. 396-397), there are three different approaches that can be used to compare cases, depending on the experienced relationships between them:

> *"Cases which can be integrated as different data-points all fall under the same conceptual and explanatory model...*
> *Where cases correspond to different explanations, they deal with the same kinds of phenomena or processes, but demand quite different explanatory models…*
> *A much more radical difference is present when the different cases correspond to different images. The cases are seen to differ, not just in degree or in explanatory account required, but in kind."*

To assign the individual ways of implementing an HSMS to appropriate groups, it was necessary to consider the organisational and regulatory contexts of the HSMSs. The organisational contexts were compared across all participating fire departments. The review of regulatory contexts required a country perspective because both the literature and the initial findings from the pilot studies indicated that the legal determinants of HSMS implementation stemmed mainly from national activities of H&S authorities. Thus, the case organisations were considered *"different data-points"* McPhee (1990, p. 396) of H&S management at fire departments. For example, the formal approaches to employee involvement were expected to differ between Germany and Sweden because national laws stipulate different roles for employee representatives. While the Swedish 'skyddsombud' has the power to stop dangerous work duties and to inform H&S authorities, the German 'Sicherheitsbeauftragte' is expected to promote H&S awareness and support top management. Such power differences are likely to affect the ways of implementing an HSMS (Hopkins, 2006).

The relationship between top managers' H&S motivations and their ways of implementing an HSMS was expected to require different explanations in different circumstances. Therefore, a typology, rather than a single explanatory model, was developed from cross-case analysis, describing the main relationships between H&S motivations and ways of implementing an HSMS (McPhee, 1990). The motivation codes from the interview transcripts were combined to form motivation themes, taking the managerial and regulatory contexts into account. For different motivational settings, top managers were expected to have varying views on the determinants of a good HSMS. For example, a legal motivation should result in more formal documentation than a focus on H&S performance, that is, actual H&S conditions. The resulting ways of implementing an HSMS were still deemed to represent similar kinds of practices that could be described with respect to Figure 2.7. Varying managerial priorities were not expected to create *"different images"* McPhee (1990, p. 397), but rather different manifestations of H&S management. The envisaged typology of managers' H&S motivations answered the research question of this study: How are top managers' ways of implementing an HSMS affected by their H&S motivations in different regulatory environments?

Chapter 6
Individual Ways of Implementing an HSMS in Varying Contexts (Within-Case Analysis)

Overall, 30 examples of implementing an HSMS were identified during the interviews at 12 case organisations. Following the conclusions of Chapter 5, the analysis was done using the fixed-coding framework derived from the literature as the HSMS model presented in section 2.4. The individual ways of implementing an HSMS are presented in the following, sorted into three groups based on generic organisational context. Findings were triangulated with organisational documents and the researcher's impressions from his visits to the main fire stations of the fire departments.

The main study's 12 fire departments were referred to as D-2 to D-5 in Germany (D-1 was part of the second pilot study), NL-2 to NL-5 in the Netherlands (NL-1 was part of the first pilot study) and S-2 to S-5 in Sweden (S-1 was excluded as described below).

6.1 Organisational contexts and interview settings

The identified 30 ways of implementing an HSMS comprised 10 examples from each country. Either two or three examples of HSMS implementation were reviewed together with the interview participants at each of the four fire departments in Germany, the Netherlands and Sweden. The outcomes were grouped based on the organisational model of Capon (2004), distinguishing between three generic contexts for H&S management:

- Ongoing operations and behaviour
- Change projects
- High-level decisions

Capon (2004) described four central factors that shape an organisation's internal environment. First, there is a structure that defines the roles of individuals (for example in hierarchies) and groups (for example departments). Second, there are dependencies between the organisational parts in terms of tasks and interests. Third, resource

allocation varies within the organisation, and fourth, the behaviour of organisational members shapes actual practices. Obviously the latter was most important for commanding fire officers when dealing with ongoing day-to-day operations. They had to control the H&S behaviours and procedures on the work floor. In change projects, they would additionally allocate dedicated resources and create minor (temporary) structural changes in the organisation. Finally, their high-level decisions were affected by inter-dependencies with other parts of the overall organisation, especially the municipal administrations. Such decisions might result in major changes in resource allocation and structures, as well as in the behaviours of organisational members. In line with these categories, three generic contexts were used to group the identified ways of implementing an HSMS.

Regarding the external environment for H&S management, there are national variations in H&S regulations due to historical and socio-political influences in Germany, the Netherlands and Sweden (Walters and Wadsworth, 2014). The characteristics and effects of these contextual differences are considered in Chapters 7 to 9, where managers' perceptions of organisational contexts and authorities' regulatory approaches are analysed. The other main factors of the external organisational context, such as the technological, economic and competitive environment and the associated interdependencies (Capon, 2004), were considered similar for all but one organisation.

The Swedish fire department S-1 was excluded from the analysis due to a local 'competitive' situation with neighbouring fire brigades. Although S-1 was formally independent, it was supposed to cooperate with neighbouring organisations in a very integrated way. Emergency responses were even handled by mixed teams of firefighters and commanding officers from different brigades. This resulted in comprehensive documentation of operational procedures and very little top-management leadership at S-1. After excluding this unusual context, only the fire departments S-2 to S-5 were considered.

The general characteristics of the main study's 12 participating fire departments and the settings of the corresponding 24 interviews, which were conducted in 2017, are described in Table 6.1 below.

Table 6.1

Participating fire departments and interviewees

Code	Characteristics of organisations and interviews
D-2	120 full-time firefighters at one station. Interviewees: commander (74 min), one H&S expert (68 min, head of operations).
D-3	100 full-time firefighters at one station. Interviewees: commander (67 min), two H&S experts (64 min, city's H&S advisor, specialised officer).
D-4	170 full-time firefighters at two stations. Interviewees: vice-commander (57 min, head of technology), one H&S expert (45 min, head of team).
D-5	60 full-time firefighters at one station. Interviewees: vice-commander (63 min), one H&S expert (62 min, safety representative / works council).
NL-2	200 full-time firefighters at three stations. Interviewees: commander (40 min), two H&S experts (50 min, commanding and specialised officer).
NL-3	100 full-time firefighters at one station. Interviewees: commander (68 min), one H&S expert (71 min, working full-time on H&S, no firefighter).
NL-4	150 full-time firefighters at two stations. Interviewees: commander (62 min), one H&S expert (66 min, head of procurement).
NL-5	100 full-time firefighters at two stations. Interviewees: vice-commander (49 min, head of HR), H&S Expert (67 min, former station commander).
S-2	290 full-time firefighters at six stations. Interviewees: commander (57 min), one H&S expert (75 min, commanding officer / internal trainer).
S-3	90 full-time firefighters at two stations. Interviewees: vice-commander (63 min, head of admin), one H&S expert (60 min, safety representative).
S-4	170 full-time firefighters at four stations. Interviewees: vice-commander (77 min, head of strategy), one H&S expert (57 min, HR professional).
S-5	60 full-time firefighters at one station. Interviewees: commander (42 min), one H&S expert (54 min, commanding officer / planning function).

6.2 Application of the fixed-coding scheme during within-case analysis

The fixed-coding scheme for top managers' ways of implementing an HSMS was consistently applied. The deductively derived four elements of an effective HSMS depicted in Figure 2.7 were discussed with all interviewees. As is typical for qualitative research (Bazeley, 2013), it was not always clear whether a certain element could indeed be identified in an incident description. At S-2 for example, it was initially

assumed that there was a kind of hidden top-management leadership during the analysis of an accident involving indoor firefighting. Later, however, this view was changed due to the lack of any descriptions of active leadership. At D-5 it was finally concluded that the originally assumed 'deciding' of top management did not concern the actual H&S measures at emergency responses, but rather referred to equipment procurement. Similarly, the introduction of the new overall HSMS at NL-5 was characterised by independent 'deciding' on the part of top management rather than 'innovating' in collaboration with employees. The review of questionnaire-based risk assessments at NL-4 and NL-5 indicated that this approach created awareness, which in the final coding was considered 'leading'. The relevance of dedicated employees to 'taking care' became clear at S-4 when comparing the issue with practices at D-2 and NL-3. Overall, the adjustments of the initial analyses ensured that the fixed-coding scheme was consistently applied.

The identified 30 examples of implementing an HSMS covered a wide variety of issues, such as improved work practices, new equipment, changed organisations or renewed buildings. Psychosocial risks, however, were not discussed in detail. EU-OSHA (2011) emphasised that emergency workers often cannot avoid disturbing situations in which they have to deal with fatalities or severely injured people. The authors recommended organisational measures and employee training to prevent individual overstrain. However, EU-OSHA (2011) also indicated that negative psychological effects on firefighters, such as depression or work-related stress, are much less frequent than physical injuries. Correspondingly, top managers seem to focus on physical H&S issues when implementing their organisational HSMSs.

6.3 Top managers' ways of implementing an HSMS

The ways in which top managers implemented an HSMS were elaborated based on this study's fixed-coding scheme. The identified ways of implementing an HSMS are presented in sections 6.3.1 to 6.3.3, following the generic organisational contexts described in section 6.1.

6.3.1 Ways of implementing an HSMS for ongoing operations and behaviour

The context of ongoing operations and behaviour was assumed to be central to H&S management. The literature review had revealed that the best way of implementing an HSMS is to follow the so-called PDCA circle, which describes a continuous operational process of risk assessment, measurement planning and activity completion (section 2.4). The within-case analysis indicated that there were only few examples of complete HSMSs in this context. At D-5, NL-2 and S-5, such holistic HSMSs were found for ongoing operations. At D-5 and NL-2, however, the identified ways of implementing an HSMS did not cover all operations at the respective fire departments. At D-5, a distinction was drawn between work at the fire station and emergency responses. The top management of D-5 limited the holistic HSMS to the yearly review of regular work at the station, while H&S during emergency responses were based on a behavioural approach, comprising only 'leading' and 'taking care'. Similarly, the HSMS at NL-2 covered only near-miss reporting and did not include the development and implementation of H&S measures. That is, 'innovating' referred only to the process of reporting but not to the contents. Only the holistic HSMS of S-5 seemed to cover the overall operational H&S conditions. This was underlined by the broad perspective of the commander of S-5 (interview, #00:12:00):

> *"Much of H&S management is about making staff feel safe."*
> *[„Mycket med Arbetsmiljöarbetet handlar om att få personal att känna sig trygg."]*

The commander of S-5 considered the perceptions of employees to be important for organisational H&S activities, just as the general concept of safety climate suggests (Guldenmund, 2010; Zohar, 2010). Table 6.2 describes the corresponding ways of HSMS implementation at the three organisations with complete HSMS models for ongoing operations.

Table 6.2

Identified ways of implementing an HSMS for ongoing operations and behaviour – complete models

HSMS	Description of implementation
D + I L + T	**D-5** – Risk assessments and H&S measures for regular work at the station: Yearly risk assessments were used to improve work conditions and H&S practices. Top managers decided on all H&S procedures that were 'innovated' with the help of consultants. Employee representatives were involved, and the commander actively promoted safe behaviour.
L + T	**D-5** – H&S during emergency responses: Behaviour orientation prevailed. During severe emergency responses (including saving human life), every firefighter, regardless of rank, could decide individually whether or not to comply with H&S rules. Detailed H&S rules were considered unsuitable in this context because they could endanger performance.
D + I L + T	**NL-2** – Reporting of near misses: There was an established reporting system for learning from incidents. Six part-time H&S experts ran the procedure. Together with operational supervisors, they dealt with reports and H&S measures. Top managers led by supporting a culture that promoted communication, but they decided only on major H&S issues.
D + I L + T	**S-5** – Ongoing H&S task delegation: Top management collaborated with union leaders and the safety representative ('skyddsombud') who brought staff views into the co-determination committee 'samverkansgrupp'. The commander communicated outcomes according to the lines of command. He continuously reminded staff of rules, and rewarded communication.

HSMS abbreviations: 'D – deciding', 'I – innovating', 'L – leading', 'T – taking care'

Overall, the examples in Table 6.2 demonstrated that an effective HSMS could indeed be implemented for day-to-day operations. The four elements that were derived from Vinodkumar and Bhasi (2010) were identified in interviewees' descriptions of operational H&S management.

In contrast to the holistic HSMS models at D-5, NL-2 and S-5, only incomplete HSMSs were found for ongoing operations and behaviour at other fire departments. As shown in Table 6.3, they were evenly distributed between the countries.

Table 6.3

Identified ways of implementing an HSMS for

ongoing operations and behaviour – incomplete models

HSMS	Description of implementation
D L + T	**D-2** – Smoke-diving training: H&S practices had developed historically. Medical conditions of participants were checked despite there being no H&S rules or legal provisions requiring this. The commander supported this with a positive H&S attitude. There were no discussions regarding innovations, but issues were solved with ad hoc management decisions.
D L + T	**NL-4** – Risk assessment for emergency responses: Staff H&S views were surveyed through an employee questionnaire developed by a consultancy. Management used the data as background information and as a basis for discussions. Rule innovations were not directly possible, as views represented individual feelings rather than assessments or analyses.
D + I T	**S-2** – Accident analysis regarding indoor firefighting: Internal H&S experts asked affected staff about accidents. Findings were developed in working groups. If major rule changes were necessary, top management would decide in consultation with the safety representative. Small rule changes were introduced by experts in training courses, without leading.
D + I T	**S-4** – Documentation of emergency-response practices: Firefighters were expected to document their H&S experiences. However, fewer than 5% of emergency responses were documented. Better information was obtained by asking dedicated firefighters to write H&S reports, although support from colleagues was limited. Top management did not lead.
L + T	**D-4** – Behavioural safety when smoke diving: There were no detailed H&S rules. Practices had been developed over time. Leadership was considered the duty of commanding officers, who decided individually. Informal discussions of incidents took place, but outcomes were neither documented as lessons learned nor formally approved by management.
L + T	**NL-3** – Safety during indoor firefighting: Behaviour orientation dominated. The new tactical model was used to promote a mindset shift. This new rule was not applied strictly, but it was intended to provide a new perspective on decision-making, especially for commanding officers. Actual practices varied because not all firefighters were convinced (yet).

HSMS abbreviations: ‘D – deciding’, ‘I – innovating’, ‘L – leading’, ‘T – taking care’

The incomplete HSMS models were less likely to improve H&S conditions at workplaces because either ‘leading’ or ‘innovating’ was missing. As described in section 2.4, H&S innovations require that managers create an organisational climate of open H&S communication and employee involvement by ‘leading’. This behavioural environment must be supplemented with sufficient resources for employee training,

H&S prioritisation and rule development, that is, 'innovating'. The resulting way of implementing an HSMS may be considered the core of modern proactive H&S management (Drais *et al.*; 2008; Hale *et al.*, 2012). The prerequisite for systematic H&S improvements is the existence of organisational H&S rules (Hale, 2015).

The behaviour-oriented ways of implementing an HSMS at D-5 (Table 6.2) as well as at D-4 and NL-3 (Table 6.3), indicated that top managers did not define organisational H&S rules for emergency responses. Top management did not decide, but asked employees to 'take care'. This might be considered an *"unsafe worker attitude"* as described by Bluff (2011, p. 13). Such thinking would imply that managers blamed victims for having suffered accidents. They would say that the accident would not have happened if the individual in question had followed the rules. According to Bluff (2012), this thinking neglects the technical, organisational and personal circumstances that make human mistakes more or less likely. However, the identified ways of implementing an HSMS indicated that top managers understood their influence on accident rates. They considered H&S leadership a duty of superiors, as stated by the H&S expert at D-4, who was also head of the team for rescuing from heights. He wanted to act as a role model because (interview, #00:20:50):

> *"You suddenly have people next to you for whom you are also responsible, and you are responsible for their actions even if you are not with them, so of course you need to have taught them something."*
> *[„Man eben auf einmal neben sich Leute hat, für die man mit verantwortlich ist und wo man auch verantwortlich ist für deren Handeln, wenn man nicht dabei ist, das heißt man muss denen natürlich was mitgegeben haben".]*

This individual leadership is a behaviour-oriented approach to H&S management. As suggested by the safety climate study of Yule *et al.* (2007), suitable H&S conditions were created by encouraging supervisors' H&S involvement. However, such an informal approach should result in varying H&S practices in different teams, which was seen at both NL-3 and D-5. At D-2 and NL-4, the behavioural approach was supplemented with top management decisions on H&S rules. At D-2, such decisions were limited to major problems during training activities at the station. At NL-4, top

management emphasised that they did not develop (or even innovate) organisational H&S rules for emergency responses but used formal risk assessment decisions to create H&S awareness. Thus, at both organisations, 'deciding' on H&S issues was a weak element in the HSMSs. Top managers seemed to abstain from rule definitions for the rather unpredictable circumstances of emergency responses.

At the Swedish fire departments S-2 and S-4, in contrast, there were management decisions on H&S rules and processes, but few leadership activities. The Swedish organisations tried to formally analyse firefighters' operational experiences. The vice-commander of S-4 emphasised (interview, #00:20:40):

> *"And we want, we need it to be put in paper, so we could do it systematically, so we have tried so many times to get all the experience in and look at it as a whole and find systems to improve but it's really difficult."*

At the fire department S-4, they had tried to document operational experiences for several years. The main objective was to create written reports and analyses that could be used to develop H&S rules. These were then to be used for training. As few firefighters wanted to write reports about their experiences, they concluded at S-4 that dedicated firefighters should write about defined topics, becoming H&S specialists in specific fields. They found that this approach improved the quality of written reporting. At S-2, in contrast, top management developed H&S rules through working groups. Firefighters and H&S experts discussed H&S issues that were experienced either at S-2 or at other fire departments. Both Swedish organisations aimed at developing detailed operational H&S rules for emergency responses.

Overall, the identified ways of implementing an HSMS in the context of ongoing operations and behaviour revealed a considerable variety of management practices. Even the complete HSMS models in Table 6.2 differed greatly, with their contents ranging from basic near-miss reporting at NL-2 to an overall approach at S-5. The incomplete HSMS models in Table 6.3 indicated two main approaches, especially with respect to the unpredictable working environment for emergency responses. Some top managers thought that detailed H&S rules were not necessary, while others tried to write down operational experiences in order to create a basis for rule development.

6.3.2 Ways of implementing an HSMS for change projects

With respect to change projects, the identified examples, with the exception of one HSMS at D-2, covered either all or at least three elements of an effective HSMS. Table 6.4 describes the identified ways of implementing an HSMS.

Table 6.4

Identified ways of implementing an HSMS for change projects

HSMS	Description of implementation
D + I L + T	**NL-2** – Development of guidelines for clean working: The NL-2 document 'Arbeidshygiëne' ['clean working'] described briefly and practically how clean working should be realised to prevent cancer. Top management decided on a leading framework document, which was then innovated based on employees' knowledge and experience.
D + I L + T	**NL-4** – Implementation of clean working procedures: The focus was on behaviour. A theatre play created awareness and generated discussions on possible improvements. The resulting decisions on new equipment and procedures were documented, but without formal risk assessments. The commander emphasised the issue's relevance on stage.
D + I L + T	**NL-5** – Risk assessment for clean working: A consultancy prepared a risk assessment, including an employee questionnaire survey on experiences. The response rate was improved with giveaways. A 'goodie box' (containing a laundry bag, a mask, a pair of gloves etc.) was given to firefighters to promote adherence to rules for clean working.
D + I L + T	**S-2** – New ways of working at motorway accidents: After having received a TMA ('truck-mounted attenuator') truck, a working group developed an improved procedure for H&S at sites. The commander's positive H&S reputation and the visible symbol of the new TMA truck, which was provided by the industry at no cost, created an element of leadership.
I L + T	**D-4** – Equipment innovations in the team for rescuing from heights: Team leaders were expected to lead by good example. Staff tended to focus on equipment innovations of manufacturers. New technology put pressure on top managers to provide good equipment. They did not base their decisions on analyses but agreed with team proposals in order to lead.
I L + T	**S-3** – New equipment introduction with explicit risk assessment: Top management was not very involved, but the operations working groups were responsible for risk assessments for new equipment. The resulting H&S documentation was then used for training purposes. Top management was 'leading' by promoting group discussions on H&S.

HSMS abbreviations: 'D – deciding', 'I – innovating', 'L – leading', 'T – taking care'

Table 6.4 (continued)

Identified ways of implementing an HSMS for change projects

HSMS	Description of implementation
D + I T	**D-3** – Risk assessment and risk mitigation when diving: A formal risk assessment and risk mitigation measures had been developed for the fire department's diving team. The team leader promoted the topic and considered employees' views. He discussed all issues in detail with the commander, who made the final decision. Top management did not lead.
D + I T	**NL-3** – Procurement of personal safety equipment: Documented risk assessments were continually updated using formal 'management of change protocols'. When preparing the acquisition of new equipment, dedicated test users entered their feedback on these forms. Outcomes were discussed in working groups who prepared the final decisions.
D + I T	**S-4** – Introduction of an 'FIP' process: The Swedish term 'FIP' means that the first (commanding) firefighter does not go with the first fire engine, but rather alone. Top management, the safety representative ('skyddsombud') and union leaders discussed the new process. Local commanders reported on employees' views. There was no leading.
D + I T	**S-5** – Risk assessment for young interns: This was about the city's social initiative to offer young people from the edge of society an internship. Because many firefighters opposed the idea, the risk assessment was used as a communication/political tool, involving the 'skyddsombud'. There was no leading because top management saw little operational relevance.
D T	**D-2** – H&S checks for machinery and equipment: The commander decided that a dedicated employee should monitor regular technical H&S checks. He created a new position after informal discussions with staff. The internal job advertisement aimed at improving reliability and creating knowledge, making D-2 independent of manufacturers' guidelines.

HSMS abbreviations: 'D – deciding', 'I – innovating', 'L – leading', 'T – taking care'

With respect to the HSMS models in Table 6.4, management approaches seemed to reflect the importance of envisaged changes. Three types of change projects were identified:

- Symbolic changes implemented with holistic models (NL-2, NL-4, NL-5, S-2)
- Major changes driven top-down with little staff input (D-2, D-3, NL-3, S-4, S-5)
- Minor changes based on leadership and employee innovations (D-4, S-3)

The symbolic changes related to important topics that had been widely discussed in the organisations. Most employees were aware of those H&S issues, and top management

supported improving the H&S conditions. In the Netherlands, the topic of clean working during emergency responses was a nationwide H&S topic in 2017, when the interviews for this study were conducted. Therefore, related H&S projects were identified at three fire departments (NL-2, NL-4, NL-5). The managers of all three organisations took a holistic approach to implementing changes in this area. They promoted improvements by leading with symbols and providing opportunities for employee discussions. The symbols were presented in the form of shirts bearing the logo *"Arbeidshygiëne"* at NL-2, a theatre play on clean working at NL-4 and a 'goodie box' with masks and gloves at NL-5. In all organisations, workshops and team discussions were held in order to develop practical solutions for cleaner working in day-to-day operations. Similarly, at S-2, top management and employees discussed safer ways of working at traffic accidents. Here, a new TMA (truck-mounted attenuator) truck, which the industry provided at no cost to S-2, was the visible starting point for developing new procedures. The TMA was expected to increase the safety of firefighters by absorbing the impact of vehicles that subsequently crash into the emergency site. Employees considered this issue to be highly relevant, as three Swedish firefighters had died at traffic accident sites in the previous year. Finally, the holistic way of implementing an HSMS resulted from top management's decisions on H&S rules and investments in equipment.

Regarding major changes that were not related to symbols, and that were probably less widely discussed within the organisations, another way of implementing an HSMS was identified. As became clear at D-2, D-3, NL-3, S-4 and S-5, decisions were based on employee involvement but managers did not act as leaders. From the case descriptions in Table 6.4 it might be concluded that the characteristics of these examples were less suitable for leadership, either because the H&S issues were not clear or relevant enough (NL-3, S-4) or because commanders wanted to decide on their own authority (D-2, D-3, S-5).

Minor changes were managed without any top-management decisions at D-4 and S-3. In these examples, top managers left it to their employees to find solutions for H&S issues. At D-4, the team for rescuing from heights was allowed to decide independently which equipment should be bought. The background to this freedom was that the equipment required few financial resources. The working groups at S-3 elaborated H&S rules (based on risk assessments) for new equipment, such as recently bought fire

trucks. Those rules were of rather minor relevance because the resulting H&S measures were mainly determined by earlier investment choices. In both cases, top managers did not decide because the H&S issues did not appear to them to be relevant enough. Nevertheless, they acted as leaders in order to encourage employees to develop their own H&S solutions.

From the reports in Table 6.4, it was concluded that HSMSs implemented for change projects tended to cover more elements of an effective HSMS than those implemented for ongoing operations and behaviour. If the HSMS approach was not holistic, it still seemed to be suitable for the specific context. If 'deciding' on the part of top managers was lacking, the expected H&S measures were not important enough. If managers did not lead, the H&S issues were either not important or top managers wanted to decide on their own authority. Overall, three different kinds of change projects were identified.

6.3.3 Ways of implementing an HSMS for high-level decisions

As in the two previous contexts of day-to-day operations and specific projects, exemplified in the descriptions of HSMS implementation in Table 6.3 and Table 6.4, a variety of managerial ways of implementing an HSMS were identified for high-level decisions in organisations, as described in Table 6.5.

Table 6.5

Identified ways of implementing an HSMS for high-level decisions

HSMS	Description of implementation
D + I L + T	**D-2** – Building measure for clean working at the fire station: Planning was initiated by the commander after employees informed him of contamination in the workshop. The building plan was not based on a formal risk assessment; instead, a pragmatic solution was developed in collaboration with the city. H&S communication was rewarded.
D L + T	**NL-5** – Introduction of a new HSMS with ambitious objectives: A dedicated H&S task force was led by former local commander, who acted as the H&S expert and leader to engage employees. Top management decided on structures, including an H&S steering group and an H&S working group. Staff wad expected to do 75% of future H&S work.

HSMS abbreviations: 'D – deciding', 'I – innovating', 'L – leading', 'T – taking care'

Table 6.5 (continued)

Identified ways of implementing an HSMS for high-level decisions

HSMS	Description of implementation
D L + T	**S-3** – Equipment purchasing with implicit risk assessment: A working group for purchasing took a holistic view of new equipment (e.g. new fire extinguisher on truck). No formal risk assessment was conducted, and staff was generally not involved. Decisions were based on economics and the manufacturer's H&S knowledge, supported by managers' leading.
D + I	**D-3** – Decision on formal instruction for using chainsaws: Guidelines for additional chainsaw training at D-3 were developed in collaboration with the city's H&S expert. They resulted in better employee training. The commander was not focused on behavioural change. Therefore, he did not lead, but created the training with his staff's views in mind.
D + I	**NL-3** – Formal H&S procedure as means of organisational politics: An H&S item on meeting agendas could be misused for organisational politics. Managers observed that issues were put in the H&S context to get budgets. They preferred not to have separate H&S items, as decisions were always related to other issues, too. This prevented H&S dominance.
D + I	**S-4** – Organisational change for a new management structure: A consultancy recommended organisational change. To take related H&S topics into account, a working group was created with three top managers and two union representatives. Meetings included brainstorming sessions on H&S issues. There was no direct employee involvement.
D + I	**S-5** – Risk assessment for removal of small fire engines: Small vehicles were no longer used in order to save money to meet the city's budget. Employees' work was the smaller part of the assessment, which focused on overall effects on the organisation and the municipality. Management discussed the assessment with the 'skyddsombud' (safety representative).
D	**D-4** – Decision to rebuild the smoke-diving workshop: This H&S measure for clean working was adopted when a neighbouring room in the building became available due to general restructuring. Top managers' independent decision took both the economic performance and the H&S conditions into consideration. No formal risk assessment was conducted.
D	**NL-4** – Risk assessment for fire station buildings: The risk assessment was based on visits to the fire stations. It was carried out in cooperation with an external consultant who identified relevant H&S problems. According to the commander, it was then up to management to improve the situation. The analyses focused on technical and engineering matters.

HSMS abbreviations: 'D – deciding', 'I – innovating', 'L – leading', 'T – taking care'

The background to the holistic or near-holistic management approaches for high-level decisions at D-2, NL-5 and S-3 seemed to differ from that for operational change projects. Interviewees did not report on specific employee ideas, but referred to employees' agreement with top-management decisions. The H&S expert at NL-5 emphasised that it was necessary to convince the staff that H&S measures were beneficial (interview, #00:15:10):

> *"So we have to get the staff on board to make this happen."*
> *[„Wir müssen also die Mannschaft mitnehmen, um das zu organisieren."]*

Thus, the ways of implementing an HSMS were similar to those frequently observed in change projects, but the contents of communication between top management and employees differed. The decisions on an ambitious organisational HSMS at NL-5 and new equipment at S-3 took employees' views into account, but without discussing H&S issues in detail. Employees were 'taking care', but there was no 'innovating'. The commander of D-5 formalised the involvement of his firefighters because he tried to use their agreement to strengthen his position in budget negotiations with the city. Management tried to ensure employees' support in all three cases.

The core of the remaining six examples of HSMS implementation was top-management decision-making. At D-3, NL-3, S-4 and S-5, managers followed formal procedures to involve employees or their representatives. Accordingly, the element of 'deciding' was accompanied by 'innovating'. There was hardly any practical H&S communication, but instructions or organisational changes were implemented according to formal procedures. H&S might be considered an element of organisational politics, as discussed at NL-3 and S-5. Besides formal employee involvement, there were examples of independent decisions by top managers who simply relied on their superior positions (D-4, NL-4). In all cases, H&S rules and measures were defined in a top-down manner, defining the general framework for operations at the fire departments. The different ways of implementing an HSMS might be interpreted as outcomes of organisational cultures, that is, they reflected the ways in which managers were supposed to implement their decisions.

To summarise, the identified ways of implementing an HSMS in Table 6.5 suggested that there were two main ways of making decisions on H&S issues that required high-level decisions. On the one hand, top management took employees' views into account to ensure their support for decisions. On the other hand, decision-making procedures were followed.

6.4 Conclusions on the individual ways of implementing an HSMS

The 30 ways of implementing an HSMS that were identified at the 12 participating fire departments were grouped according to their organisational contexts. This showed that top management applied different HSMS models in varying contexts. For ongoing operations and behaviour, the four elements of an effective HSMS were usually not covered. The HSMSs were either governance oriented, focusing on the development of organisational H&S rules, or behaviour oriented, emphasising informal communication between managers and employees. High-level decisions were mainly governance based, as was to be expected. Only management practices for change projects were often characterised by holistic ways of implementing an HSMS. As H&S change projects had been implemented in many fire departments in all three countries, these seemed to be an organisational context in which managers followed the recommendations of the literature on safety climate. Besides identifying the variety of ways to implement an HSMS, the within-case analysis confirmed that the fixed-coding scheme of this study was a suitable tool for describing managerial practices, providing an empirically confirmed HSMS model.

Chapter 7
Integrated Ways of Implementing an HSMS under National Regulations (First Cross-Case Analysis)

The first cross-case analysis was aimed at grouping the identified ways of implementing an HSMS into relevant categories of approaches to H&S management. Based on the resulting framework, country cases of managerial and regulatory practices were developed. The varying organisational contexts were expected to determine the manifestations of the management approaches. Therefore, interviewees' context descriptions were analysed in depth to further elaborate the generic grouping presented in Chapter 6.

7.1 Organisational context analysis

The contextual factors according to Capon (2004) formed the theoretical basis for the descriptive coding of interview statements on organisational contexts. Codes of behaviour, structure, resources and internal dependencies were considered. This resulted in the following categories within each of the three general contexts that were initially used for sorting the individual ways of implementing an HSMS (Chapter 6).

Categories of context codes relating to ongoing operations and behaviour:

- spontaneous meetings and pragmatic views
- scheduled meetings and regular analyses

Categories of context codes relating to change projects:

- defined project structures
- backgrounds of introducing completely new or revised procedures

Categories of context codes relating to high-level decisions:

- inter-dependencies with other parts of the organisation and the municipality
- backgrounds of major decisions on equipment or re-organisations

The analysis of context codes yielded two clearly opposing categories for ongoing operations and behaviour. The behaviour of organisational members was either characterised by spontaneous meetings and pragmatic views (as mentioned at fire departments D-2, D-4, D-5, NL-4, NL-5 and S-3) or dominated by scheduled meetings and regular analyses (as described at D-3, NL-2, NL-3, S-2, S-4 and S-5). Thus, the 12 fire departments in this study could be divided into two groups of six based on the behavioural context codes in ongoing operations. The two coding categories were considered overall behavioural characteristics of the organisations, referring not only to ongoing operations but also to change projects and high-level decisions. The two categories were based on six descriptive codes each, as shown in Table 7.1.

Table 7.1

Overall behavioural coding and number of references in the data

Pragmatic organisations spontaneous meetings / pragmatic views at D-2, D-4, D-5, NL-4, NL-5 and S-3	**Formalistic organisations** scheduled meetings / regular analyses D-3, NL-2, NL-3, S-2, S-4 and S-5
historically developed H&S practices (five references)	regular H&S meetings (six references)
practically trying what is best at the moment (four references)	continual documentation (three references)
informal team meetings (three references)	dedicated meetings (three references)
H&S combined with other questions (three references)	dedicated employees (two references)
technical analyses by top management (two references)	safety walks (one reference)
fast problem-solving (one reference)	mindset shift based on new rules (one reference)

The two identified organisational contexts were assumed to be relevant to all kinds of HSMS implementation. Although the behaviour of organisational members was most obvious in ongoing operations, it also affected change projects in operations. Regular meetings and continual documentation tended to result in formal project structures, while trial-and-error approaches and informal team meetings corresponded to little

planning of work structures and resources. It was expected that this basic tendency towards either comprehensive or limited planning was also reflected in high-level decisions. Thus, for the subsequent analysis it was assumed that there were two kinds of organisations. Those that relied on spontaneous meetings and pragmatic views were called 'pragmatic organisations', and those that preferred scheduled meetings and regular analyses were referred to as 'formalistic organisations'.

The top managers of all Dutch fire departments and all but one Swedish fire department defined clear project structures when introducing completely new or revised H&S procedures. Similar project set-ups were also found in Germany, although they were described as either very new (first H&S project at D-3, second working group meeting at D-4) or as being related to engineering issues, such as the equipment checks at D-2 and the risk assessments at D-5. Indeed, the latter example from D-5 might be considered a recurring project rather than a complete model for ongoing operations and behaviour (Table 6.2), because a temporarily defined team conducted the risk assessment with the help of a dedicated consulting budget. Even the complete HSMS model for operations at S-5 had the character of a project, although the management of S-5 did not report having implemented a project structure. The H&S expert at S-5 emphasised that the risk assessment of young interns was conducted by the standing co-determination committee ('samverkansgrupp', prescribed by Swedish law), which was considered central to the general H&S management in the organisation. All ongoing H&S task delegation was done by that committee. Nevertheless, when describing his holistic HSMS implementation for ongoing operations, the commander of S-5 narrowed down his H&S activities to a project-like context (interview, #00:40:40):

> *"I think you must focus on specific things. You cannot do everything at the same time, but when it is clear that it [the measure] develops very good, then we take the next."*
> *["Jag tror man måste fokusera på vissa saker. Man kan inte allt göra samtidigt, utan när det är klart det [åtgärdet] blir jättebra, då tar vi det nästa."]*

The descriptions of the commander and the H&S expert at S-5 suggested that formal procedures and actual practices deviated. By focusing on selected topics, top management personally promoted corresponding H&S measures while putting less

effort into other H&S issues. Obviously, this approach could be interpreted as a deviation from the decisions of the co-determination committee. Additionally, the focus on selected topics might be considered illegal because Swedish law prescribes an integrative managerial view on H&S issues rather than separate, project-like activities (Sanne, 2018). Such a deviation between the formal HSMS implementation and operational H&S practices was also reported by the commander of the fire department S-2, where the human resources department managed the formal relationship between the employer and the employees, while technical experts were responsible for day-to-day H&S issues. Overall, interviewees' descriptions of organisational structures and resource allocation indicated that project structures were widespread and, apparently, important for implementing an HSMS.

Regarding high-level decisions, the analysis of participants' context descriptions did not reveal any remarkable characteristics or substantial differences between fire departments. The identified inter-dependencies mainly concerned the fire departments' relationship with the administration of their municipalities. They related to budgets, performance targets and technical guidelines. They affected decisions on investments in buildings and equipment as well as re-organisations. Thus, the municipalities determined the physical and operational environment in which HSMSs were implemented. Although the interviews revealed no major differences between fire departments, the researcher's site visits suggested that Dutch and Swedish fire departments were well equipped compared with German ones. The fire stations in the Netherlands were very modern, and the fire departments in Sweden were so well staffed that many non-core activities were mentioned (for example, working groups on tactical or operational innovations and incident analyses). The budgets of German fire departments, in contrast, seemed to be very constrained. The station buildings of D-4 and D-5 were very old, and it was obvious that modern H&S standards could not be met. The commander of D-2 emphasised (interview, #00:35:20) that *"there are way too few people and employees in the fire department"* for tactical analyses. And the commander of D-3 praised his regional H&S authority for inviting mayors to site inspections and asking them (interview, #00:26:35): *"What are you doing for occupational health and safety at your fire department?"*

In summary, the analysis of the organisational contexts revealed two main groups of organisations: those with formalistic practices and those with pragmatic behaviours. In terms of project structures, the cross-case comparison of interviewees' context descriptions suggested that the complete HSMS model for operations at D-5 and S-5 should be considered change projects due to their corresponding characteristics and the general importance of project structures. Additionally, the site visits made it clear that German fire departments had fewer resources available than their Dutch and Swedish counterparts.

7.2 Basic approaches to H&S management

After the context analysis described in section 7.1, the 30 identified ways of implementing an HSMS were grouped into four basic approaches to H&S management. The contrasting behavioural environments and the contextualised HSMS models formed the basis for the grouping. The characteristic project structures revealed in section 7.1 were reflected by reallocating the two complete HSMS models for operations at D-5 and S-5 to the group of change projects. The limited H&S resources in Germany served as background information. The cross-case analysis was conducted according to Table 7.2, which is shown on the next page.

In the first column of Table 7.2, a distinction is drawn between 'pragmatic organisations' and 'formalistic organisations'. In the second column, the ways of implementing an HSMS are listed by the associated contexts. The contextualised categories reflect the analyses of Chapter 6 and section 7.1. In the third column, the basic approaches to H&S management are presented as outcomes of the thematic analysis. These consistently described the relationships between organisational contexts and H&S management for all the identified examples of HSMS implementation, with the exception of safety management for indoor firefighting at NL-3. This exception was therefore excluded from the explanatory concepts in this section, but it is taken into account in the country cases in section 7.3.

Table 7.2

Cross-case analysis to develop basic approaches to H&S management

Overall behavioural coding	Specific contexts of HSMS implementation	Basic approaches to H&S management
Formalistic at NL-2, S-2, S-4	Ongoing operations & behav. at S-2, S-4: HSMS with D+I+T	Co-determination at S-2, S-4: HSMS with D+I+T, *no 'L'*
	Ongoing operations & behav. at NL-2: HSMS with D+I+L+T	Focusing at NL-2: HSMS with D+I+L+T
Pragmatic at D-2, D-4, D-5, NL-4	Ongoing operations & behav. at D-2, NL-4: HSMS with D+L+T	Co-operation at D-2, NL-4: HSMS with D+L+T, *no 'I'*
	Ongoing operations & behav. at D-4, D-5, *NL-3**: HSMS with L+T	Domination at D-2, D-4, D-5, NL-3: HSMS with L+T or D+T, *no 'I'*
	Change projects at D-2: HSMS with D+T	
Formalistic at NL-2, S-2, S-5 and pragmatic at D-4, D-5, NL-4, NL-5, S-3	Change projects at D-5, NL-2, NL-4, NL-5, S-2, S-5: HSMS with D+I+L+T	Focusing at D-4, D-5, NL-2, NL-4, NL-5, S-2, S-3, S-5: HSMS with (D)+I+L+T
	Change projects at D-4, S-3: HSMS with I+L+T	
Formalistic at D-3, NL-3, S-4, S-5	Change projects at D-3, NL-3, S-4, S-5: HSMS with D+I+T	Co-determination at D-3, NL-3, S-4, S-5: HSMS with D+I+(T), *no 'L'*
	High-level decisions at D-3, NL-3, S-4, S-5: HSMS with D+I	
Pragmatic at D-2, D-4, NL-4, NL-5, S-3	High-level decisions at D-2: HSMS with D+I+L+T	Focusing at D-2: HSMS with D+I+L+T
	High-level decisions at NL-5, S-3: HSMS with D+L+T	Co-operation at NL-5, S-3: HSMS with D+L+T, *no 'I'*
	High-level decisions at D-4, NL-4: HSMS with D	Domination at D-4, NL-4: HSMS with D, *no 'I'*

* Although NL-3 was formalistic, the HSMS for ongoing op. was not overly formal: well-defined H&S rules were not enforced but promoted with dedicated leadership.

Table 7.2 describes the basic approaches to H&S management with reference to the HSMS model that was developed through the literature review. The four elements of an effective HSMS, shown in Figure 2.7, were covered to differing degrees. These differences and the related contexts were used for case grouping. It became clear that the fire departments applied H&S management approaches that fitted with their general behavioural characteristics. Governance-oriented ways of implementing an HSMS were found at the 'formalistic organisations', and behaviour-oriented ways were identified at the 'pragmatic organisations'. In both cases, one specific element of an effective HSMS was typically missing. As shown in Table 7.2, the formalistic approach of co-determination was characterised by *no 'L'*. Top management did not show leadership to convince employees of H&S measures. This diminished the impact of the HSMSs on actual H&S conditions due to reduced staff participation. The pragmatic approaches of co-operation and domination, in contrast, were characterised by *no 'I'*. Employees did not innovate H&S procedures because there were no innovation frameworks (for example, processes or budgets for H&S improvements) and they could not discuss H&S issues with top management. Only the focusing approach comprised both leading on the part of top management and innovating on the part of employees. Especially in the context of change projects, all kinds of organisations applied holistic ways of implementing an HSMS. The H&S management approach was both universal and optimal, as it was found in all types of organisations and covered all elements of an effective HSMS.

The basic approaches to H&S management were developed as explanatory concepts that described the relationship between organisational contexts and managers' ways of implementing an HSMS. Four approaches were identified (column three of Table 7.2):

- Focusing, which was universally applied, particularly in change projects
- Co-determination, which was found at 'formalistic organisations'
- Co-operation, which was found at 'pragmatic organisations'
- Domination, which was found at 'pragmatic organisations' mainly in Germany

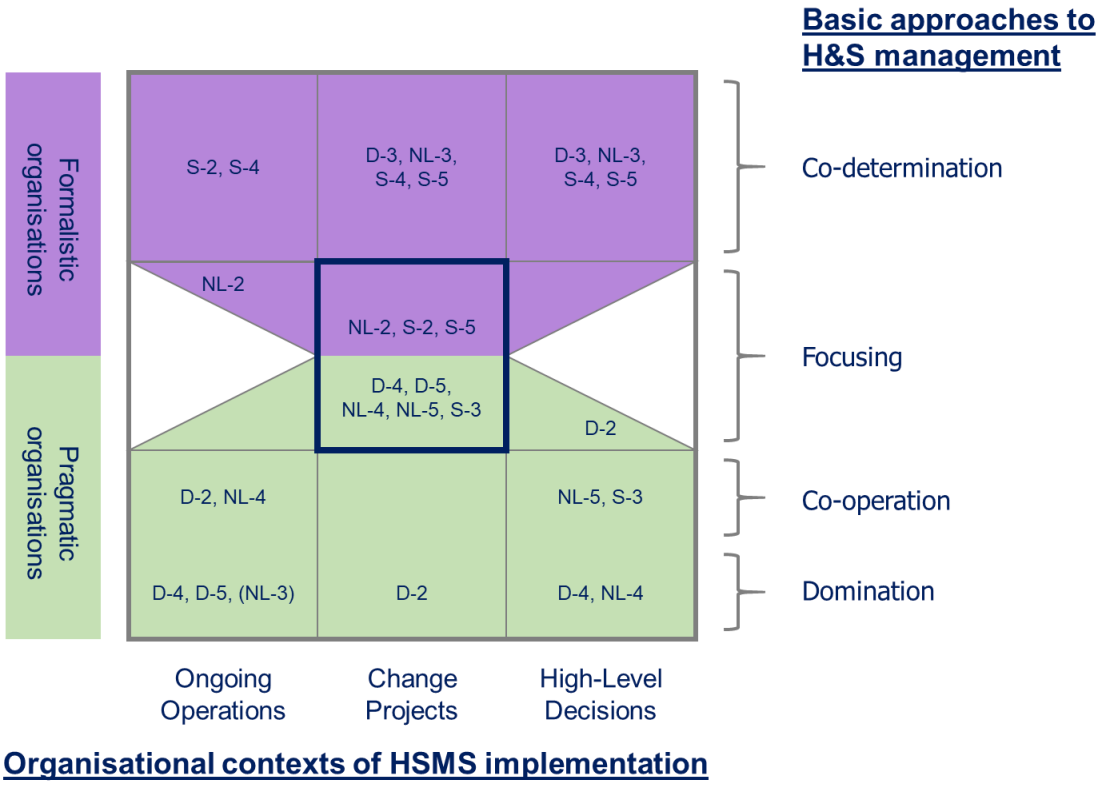
Managers of 'formalistic organisations' chose between a co-determination or focusing approach, with the latter being more common in change projects. Managers of 'pragmatic organisations' adopted a co-operation or domination approach, in addition to a focusing approach in change projects. This was demonstrated based on the examples

of identified ways of implementing an HSMS at the case organisations. The four basic approaches to H&S management were elaborated and explained with reference to those examples (see sections 7.2.1 to 7.2.4). Figure 7.1 below illustrates at which case organisations the respective ways of implementing an HSMS were identified. The focusing approach was observed at nine of the 12 fire departments, mainly in the context of change projects. The approaches of co-determination and domination were found at five organisations, while there were four cases of co-operation.

Figure 7.1

Cross-case analysis to develop basic approaches to H&S management

(developed by the author)



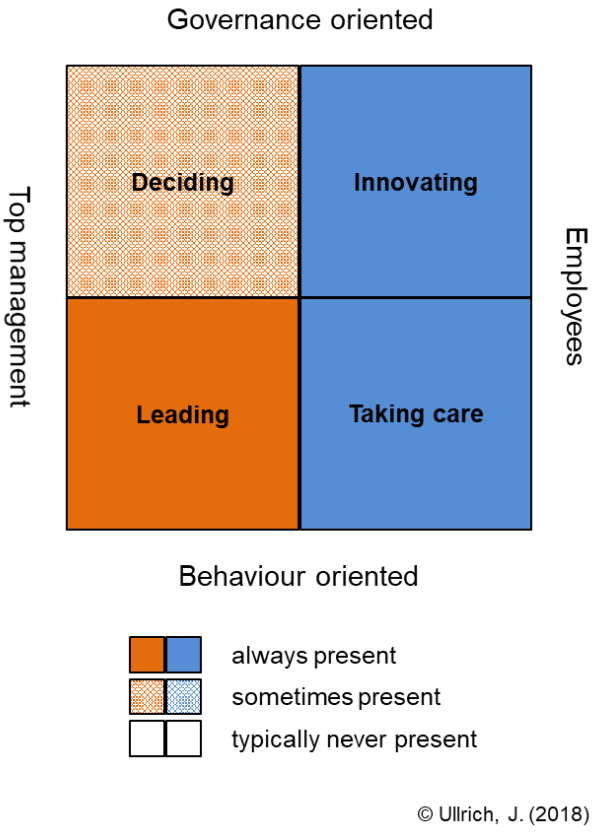
7.2.1 **Focusing** approach to H&S management

Most examples of the focusing approach to H&S management were identified in the context of change projects, as shown in Figure 7.1. The ways of implementing an HSMS were characterised by typically covering all four elements of an effective HSMS. In any case, top managers acted as H&S leaders and employees developed H&S innovations that were subsequently implemented through taking care. Decision-making

by top management may be replaced by team decisions in the case of minor changes, which was revealed at D-4 and S-3 (section 6.3.2). Figure 7.2 summarises the findings.

Figure 7.2

Focusing approach to H&S management (developed by the author)



In terms of holistic HSMSs according to Figure 7.2, the three Dutch organisations NL-2, NL-4 and NL-5 provided comparable examples of implementing H&S measures for clean working ('Arbeidshygiëne'). The background was an initiative of the national association 'Brandweer Nederland', which had taken a non-binding decision in 2015 to improve H&S conditions at Dutch fire departments in this regard. The described activities comprised the use of symbols standing for the envisaged change. Managers promoted improvements by leading and providing opportunities for employee discussions. At the Swedish fire department S-2, similar characteristics were identified in relation to the implementation of new procedures for motorway accidents, which included using a special fire truck as a physical symbol for the envisaged change. When such focusing approaches to H&S management were adopted, managers were personally involved and remained focused on their projects. In this way, they showed leadership in motivating employees to innovate H&S procedures and to take care of H&S issues.

Regarding ongoing operations and behaviour, continuous top-management focus was only identified at NL-2. The interviews at D-5 and S-5 revealed, in contrast, a more project-like management style that implied a temporary focus on specific H&S measures. At NL-2, the presented near-miss reporting was considered a central part of the overall work culture. The commander of NL-2 emphasised that bottom-up communication was very important because the firefighters knew best how to act (interview, #00:22:15):

> *"The people in the fire stations, they are the professionals. They have the best ideas about how they can do their work. They are serious in their work. They know where the easiest improvements can be made. So, let's use that knowledge."*

The mentioned knowledge was supposed to be collected by the fire department's H&S experts, who were responsible for running the reporting system for near-misses. Six employees were active in this field, which could be considered a lot in an organisation of about 200 full-time firefighters. They had a rather formal and technical focus, but they did indeed describe that they discussed reporting procedures and H&S measures with staff. Basically, the H&S experts provided the system's governance orientation, while top management demonstrated behaviour-oriented leadership. This combination created a complete HSMS for the field of near-miss reporting. However, 'innovating' referred only to the process but not the contents of reporting. The implementation of H&S measures corresponded with the co-determination approach to H&S management (section 7.2.2).

At the 'pragmatic organisations' D-4 and S-3, a focusing approach without 'deciding' was identified. Although not all four elements of an HSMS were covered, the described ways of implementing an HSMS were considered optimal, too. Management allowed staff to decide on specific personal equipment (at D-4) or operational procedures (at S-3) on their own. 'Innovating' was promoted as team discussions, and working groups were encouraged. At D-4, supervisors discussed with their teams and reported what kind of equipment they considered most appropriate. At S-3, risk assessments and procedures for new equipment were discussed at work-floor level. In both cases, top

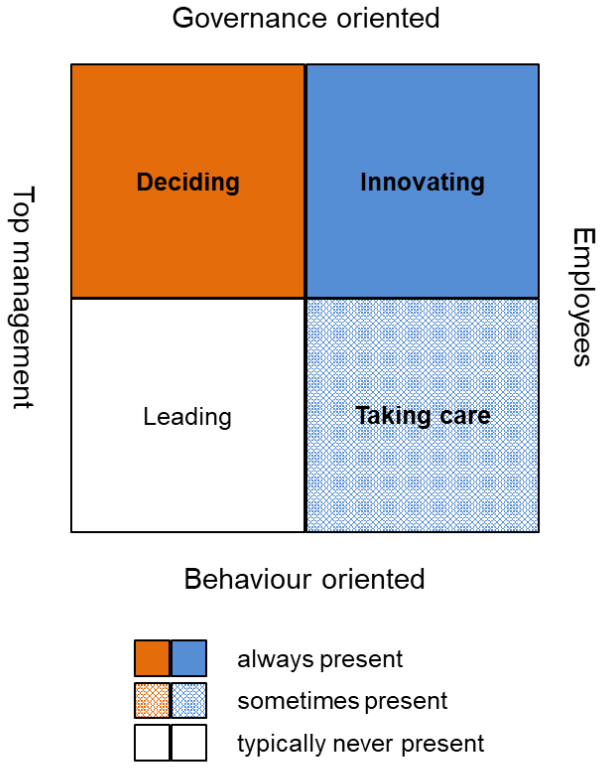
management would follow employees' recommendation as long as they fitted with the overall operational performance and budget targets. The vice-commander of D-4 described that top management asked employees to actively report about new equipment they saw at other fire departments or at trade fairs because he could not know or notice everything. At the same time, the H&S expert at D-4 thought that firefighters were typically interested in technical equipment. Thus, 'leading' by top management was based on the general interests of employees, that is, 'taking care'. In such cases, the focus resulted from employees' involvement.

7.2.2 Co-determination approach to H&S management

As depicted in Figure 7.3, the main characteristic of the co-determination approach to H&S management was the lack of 'leading' by top management. There was a clear governance orientation, which was sometimes supplemented with 'taking care' of employees for somewhat operational H&S issues.

Figure 7.3

Co-determination approach to H&S management (developed by the author)



Co-determination seemed to produce comprehensive H&S documentation but limited improvements of actual H&S conditions, because employees' rule compliance was expected to be low due to the lack of behaviour orientation (Chapter 2). Nevertheless, the documentation could be expected to ensure that legal requirements of H&S authorities were met. This approach might be considered the formal way of exchanging views between managers and employees. The identified ways of implementing an HSMS indicated that the approach was based on top-management decisions that were prepared in discussions with employees and/or their representatives. These HSMS implementations combined 'deciding' and 'innovating' as well as sometimes 'taking care'. In all observed cases, the co-determination approach showed a lack of management leadership. As described in Chapter 6 for the operational examples at S-2 and S-4, a formalistic H&S process was difficult to translate into actual H&S measures. With respect to formal decisions, the vice-commander of S-4 said (interview, #00:59:25):

> *"It [the risk assessment] is made at one time, and then when the decision is made, it kind of disappears."*

At S-2, this problem was addressed by splitting responsibilities between the human resources department and the technical H&S experts (section 7.1). The former was expected to deal with the legal requirements for H&S management, and the latter was to ensure that actual H&S measures were implemented. In this way, inspectors of H&S authorities would most likely confirm the legal compliance of such an organisation. However, in contrast to the focusing approach at NL-2 (section 7.2.1), there was no holistic HSMS for ongoing operations because top management did not provide general H&S leadership. At S-2, such an effective HSMS was only observed for the symbolic change project on new ways of working at motorway accidents. Similar to the conclusion for the major change projects in Chapter 6 (in connection with fire departments D-2, D-3, NL-3, S-4, S-5), leadership might be lacking because managers did not want to encourage employee discussions on decisions they had already made (for example at D-3 and S-5). However, with respect to the examples at NL-3, S-2 and S-4, the lack of 'leading' might also be explained by excessive complexity of the managerial contexts. That is, if there were numerous documented risk assessments, it might be hard to know what to focus on.

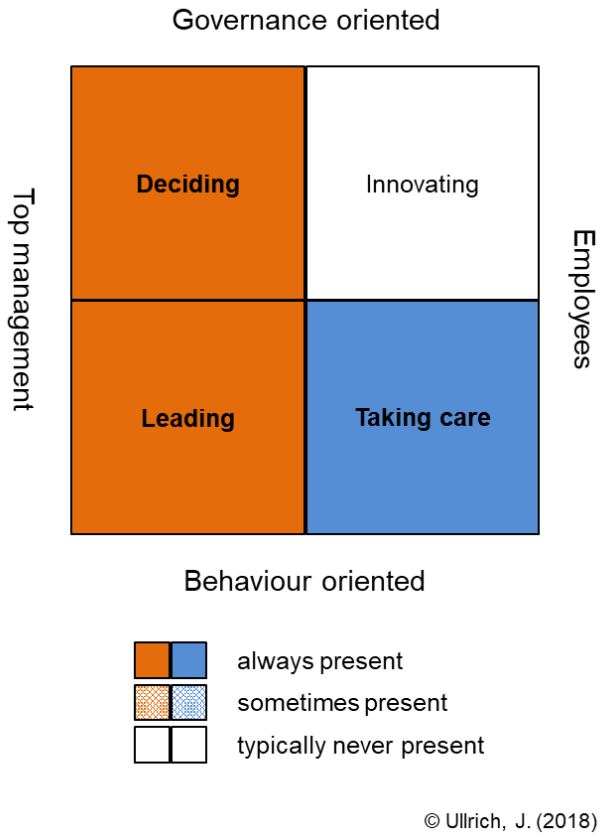
As could be expected, 'taking care' of employees was not relevant in the more abstract contexts of high-level decisions. The identified ways of implementing an HSMS at D-3, NL-3, S-4 and S-5 indicated that managers and employee representatives discussed H&S issues according to formal procedures that had little operational relevance on the work floor. The procedures were mainly based on national laws that defined employees' co-determination rights and procedures for organisational H&S management. The H&S discussions seemed to be an element of organisational politics rather than a tool for improving H&S conditions. For example, the commander of D-3 was not convinced that more chainsaw training would improve H&S conditions, but he still agreed to it because the city's H&S expert required it. The commander of NL-3 even reported having experienced that H&S items on meeting agendas were misused for political purposes. Thus, in the context of high-level decisions, the co-determination approach seemed to be formalistic in nature and rather detached from operational practices.

7.2.3 Co-operation approach to H&S management

Co-operation might be considered the pragmatic version of co-determination. In this study, four examples of this approach were identified: two for ongoing operations and two for high-level decisions (Figure 7.1). Top managers acted as leaders and demonstrated their willingness to exchange views with staff. They ensured that good H&S conditions were implemented by 'deciding' on necessary measures and persuading employees of 'taking care'. Their H&S decisions took employees' views into account, but the developed H&S measures were applied directly, without documenting risk assessments or related decisions. This approach is summarised in Figure 7.4.

Figure 7.4

Co-operation approach to H&S management (developed by the author)



'Innovating' was hardly possible due to the lack of H&S rules or documents that could be used for future training, safety prioritisations or risk assessments. Instead, existing H&S practices had developed historically. The commander of D-2 reported that this was the only suitable approach to H&S management in Germany because their firefighters were not used to abstract thinking (interview, #00:47:50):

> *"They are craftsmen… They have a firefighting qualification… but remain craftsmen throughout their lives. And craftsmen are not the ones who think through a process in theory… they fumble through it, through life, until they encounter a problem somewhere."*
> *["Das sind Handwerker... Die haben eine Feuerwehr-qualifikation… bleiben ihr Leben lang aber Handwerker. Und der Handwerker ist nicht der, der einen Prozess durchdenkt, in der Theorie… sondern der fummelt sich durch, durch sein Leben, bis er irgendwo auf ein Problem stößt."]*

The co-operation approach to H&S management also implied that the formal H&S responsibility lay with top management alone. In contrast to co-determination, managers did not refer to any group discussions or demands from employee representatives. They clearly accepted their responsibility for the H&S conditions in their organisation, apparently even more so than managers applying co-determination. For example, the commander of the formalistic S-2 emphasised that employees had to act as professionals with H&S awareness, while the H&S expert at NL-4 said (interview, #00:16:30): *"we have to educate people and get them aware of the risks of smoke."*

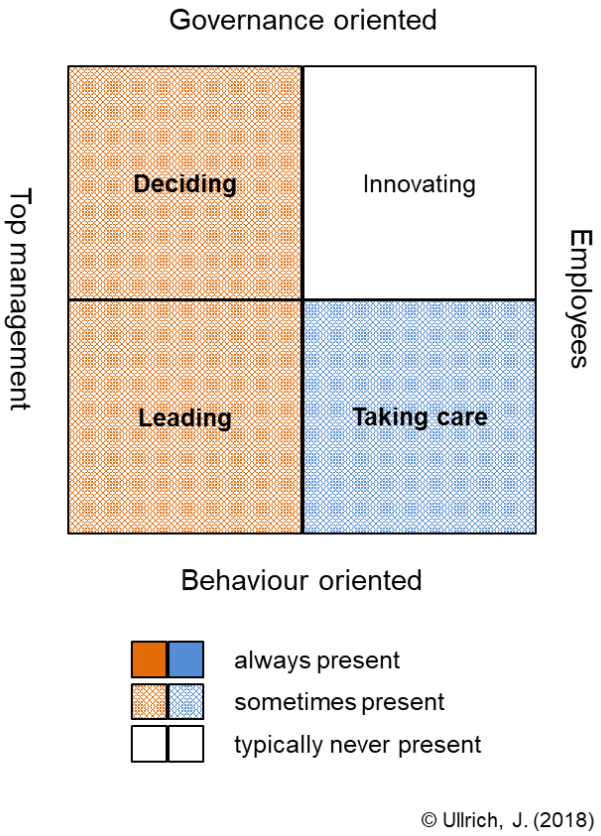
In the context of high-level decisions, the co-operation approach to H&S management was similar in form, but different in content. As already mentioned in Chapter 6, employees' ideas were less relevant for top managers' decisions, but the exchange of views was aimed at ensuring employee support for decisions. At S-3, decisions on major investments were made by top management based on both economic considerations and manufacturers' H&S knowledge. Team discussions were not considered suitable in this context. Similarly, the top management of NL-5 decided independently on the new overall structure of the H&S management organisation but ensured employee support through regular information and advertising. As described above, there was no documentation of employee involvement and (potentially) associated adjustments to management decisions.

7.2.4 Domination approach to H&S management

When domination was applied, the three characteristic HSMS elements of co-operation were only partly covered. Top management was either 'deciding' or 'leading', expecting employees to take care if H&S issues were relevant on the work floor. High-level decisions were made without considering employees' views. The domination approach to H&S management mainly relied on the organisational authority of top management, based on either formal position ('governance oriented') or personal integrity ('behaviour oriented'). The resulting ways of implementing an HSMS are depicted in Figure 7.5.

Figure 7.5

Domination approach to H&S management (developed by the author)



The fire department D-4 provided two examples of the domination approach to H&S management, one in the context of ongoing operations and one in the context of high-level decisions. At the same time, there was a complete HSMS for the change project at D-4. The interviewees described D-4 as pragmatic and economically constrained. Limited resources, in terms of both employees' work time and financial budgets, seemed to result in reduced co-operation between managers and employees. In ongoing operations, such as smoke diving, top management did not decide on specific rules, but led by example and expected employees to take care. Informal H&S discussions took place, but outcomes were not documented as lessons learnt. Regarding high-level issues, independent management decisions were predominant. The H&S expert at fire department D-5 described time constraints (caused by too many back-office duties such as equipment maintenance and training for volunteer fire departments in the region) that reduced professional firefighters' own training and recovery time (interview, #00:28:00):

> *"We are actually here more for back-office duties than for firefighting, I would say… You also realise it when the staff says: Oh, there is an emergency call, I have no time at all!"*
> *["Wir sind eigentlich mehr hier für den Innendienst als für den Brandschutz, sage ich jetzt einmal… Man merkt das auch, wenn die Leute sagen: Ah, jetzt kommt ein Einsatz, ich habe gar keine Zeit!"]*

In the corresponding examples of HSMS implementation, top managers dominated organisational H&S measures. During ongoing operations, their 'leading' aimed at pushing individual behaviour in a certain direction. For example, the vice-commander of D-4 emphasised that there were no formal rules on when to enter a building for indoor firefighting, but that he expected staff to always go inside. In the case of high-level decisions, such as major investments, top managers decided on their own. There were no reports of any discussions with employees about the decisions at D-2, D-4 and NL-4 on organisational change, workshop rebuilding or risk assessments. These organisations saw budget responsibility as resting with top managers alone. The H&S expert at NL-4 stated (interview, #00:23:00):

> *"And if they [the relevant managers] need extra money for technical, electro-technical installations or something, they have to come back with a proposal how to do it."*

The identified examples of HSMS implementation showed that the domination approach is a simplified version of the co-operation approach to H&S management. Both styles of management are applied at 'pragmatic organisations', but domination seemed to result from economic constraints. Thus, if there was a lack of resources, managers would use fewer elements of an effective HSMS in order to save time and money. As a result, less effective ways of implementing an HSMS were observed. As with co-operation, there was no 'innovating'. The other three elements varied by context and individual situation.

7.3 Country cases on H&S management and regulation

The regulatory contexts of H&S management were assumed to be mainly determined by national laws and national H&S authorities. The laws provide the framework for organisational H&S activities, not only in terms of specific H&S rules, but also with respect to employee co-determination and firefighter duties. Therefore, local variations in authorities' H&S enforcement practices, as described for example by Fairman and Yapp (2005b), were considered relatively minor. Thus, country cases were developed as themes of authorities' regulation and managers' approaches to H&S management. The regulatory contexts were reviewed with reference to the interviews at the fire departments and the literature on authorities' activities.

Managers' perceptions of their regulatory contexts were investigated with the help of two specific questions in the interview guidance for this study (Appendix B). They were asked to describe their experiences with H&S authorities and their impressions of the regulatory focus. Accordingly, the descriptive codes of interview statements were sorted into three groups:

- emphasised approaches of H&S authorities
- positive experiences of fire departments
- negative experiences of fire departments

Within these groups, categories were developed that described similar regulatory contexts from the fire departments' perspectives. In Table 7.3, those categories that were supported by statements from at least two organisations in a country were marked with grey boxes. This facilitated the comparison of countries at the level of regulatory context. Additionally, the source organisations were depicted in the boxes in order to allow a comparison with the previously analysed organisational contexts (section 7.1) and approaches to H&S management (section 7.2). Overall, the descriptions of interview participants indicated that the characteristics of regulatory environments were of mainly national origin, although one fire department in each country (that is, D-5, NL-5 and S-3) seemed to have outlying views on the national regulatory context.

Table 7.3

Analysis of interviewees' statements on regulatory contexts

Categories of codes	Germany	Netherlands	Sweden
Emphasised approaches of H&S authorities			
Rule focused	D-2, D-4, D-5	NL-2, NL-3, NL-4, NL-5	S-2, S-3, S-4, S-5
Enforcement and accident analysis	D-4	NL-2, NL-3, NL-4	S-2, S-3, S-5
Inspections every few years		NL-3, NL-5	S-2, S-4, S-5
No regular inspections	D-2, D-3, D-4, D-5		S-3
Focus on buildings and equipment	D-2, D-3, D-4, D-5		
Focus on system outcomes	D-5	NL-5	S-2, S-3, S-4, S-5
Information provision	D-2, D-3, D-5		
Positive experiences of fire departments			
Supportive and advising	D-2, D-3, D-5		S-3
Motivating and reminding		NL-2, NL-5	S-2, S-3
Open to discussions		NL-3, NL-4, NL-5	
Good relationship and mutual understanding	D-5	NL-5	S-2, S-3, S-4
Deciding			S-3, S-4, S-5
Negative experiences of fire departments			
Rules not helpful	D-2, D-4	NL-2, NL-3, NL-4	S-2, S-4, S-5
Lack of knowledge in firefighting		NL-2, NL-5	S-2, S-4
Authoritarian style		NL-2, NL-5	S-2, S-3
No definitive advice		NL-2, NL-5	

Boxes in grey reflect views of at least two organisations.

National differences in regulatory contexts could be identified in the interviewees' descriptions. The emphasised approaches of H&S authorities and the positive experiences of fire departments clearly varied by country. In terms of negative experiences, Dutch and Swedish managers had similar views, while the Germans mentioned only a few experiences. The latter might be explained with the fact that there were no regular inspections in Germany. There was general agreement among participants from all three countries that the H&S authorities focused on their own H&S rules, and that these rules were not helpful. This reflected inspectors' general habit of relying on formal procedures (Hawkins, 2002; Hale, 2015). However, the other coding categories revealed national differences that were only partly reflected in the literature, mainly in national sources. These were reviewed when developing the country cases.

In terms of regulatory contexts, the outliers D-5, NL-5 and S-3 made it clear that there were different regulatory experiences and views even within countries. D-5 and NL-5

had a good relationship with H&S authorities and were convinced that these had a holistic system focus. Thus, their statements were similar to those of most Swedish fire officers, who had a high opinion of authorities despite claiming that their rules were not helpful. The Swedish outlier S-3 was special because this fire department had not experienced regular inspections. Like their German counterparts, they were not used to enforcement measures by authorities but experienced them as supportive and advising, even appreciating their H&S rules and guidelines. However, the vice-commander of S-3 was aware of the authoritarian position of the regulator (interview, #00:51:05): *"They have a very strong, big big power."* Overall, the three individual cases of D-5, NL-5 and S-3 exemplify that the categories of Table 7.3 were interrelated.

Based on the organisational context analysis depicted in Figure 7.1, national differences in H&S management practices could only be described for ongoing operations. In the area of change projects, the identified ways of implementing an HSMS were concentrated in the focusing approach. Regarding high-level decisions, examples of co-determination and co-operation/domination were found in all three countries. Due to this context limitation, only eight of the 12 case organisations were considered in developing the country cases. Besides the fire departments NL-5 and S-3 mentioned above, D-3 and S-5 were also excluded from the country cases. The regulatory context description of the latter corresponded well with their national counterparts, but the interviewees from these fire departments did not present any ways implementing an HSMS for ongoing operations.

NL-3 stood out from the sample of HSMS implementations because it was the only one of the 'formalistic organisations' that adopted a domination approach to H&S management. As a closer look revealed, it was a special kind of domination that was based on well-defined rules that served as a non-binding basis for internal discussions. The H&S rules at NL-3 did not result in uniform behaviour, as observed at the formalistic Swedish organisations, but left room for informal agreements between management and staff, as observed at the pragmatic German organisations. This approach to H&S rules, which was similarly expressed at NL-4, served as a first indication of an apparent intermediate position of Dutch organisations in terms of H&S management. Thus, Sweden was taken as the starting point for the country case analysis. Germany was then developed based on the opposing examples of the fire departments there. Finally, the intermediate position of the Netherlands was elaborated.

7.3.1 H&S management and regulation in Sweden

Both H&S management and H&S regulation seemed to be rather formalistic in Sweden. In section 7.1, it was shown that three of the four Swedish fire departments were characterised by a formalistic context. Accordingly, for ongoing operations, the Swedish ways of implementing an HSMS represented co-determination approaches. Both the accident analysis at S-2 and the review of emergency response practices at S-4 were done in written form with well-defined responsibilities. Active leadership on the part of managers was typically lacking, as was also confirmed by Sanne (2018), who asked managers and staff of Swedish fire departments about H&S learning practices.

Looking at the legal environment, the strong position of employees could be considered an explanation of the formal management approach. Unlike in the other two countries, there are employee representatives who focus on H&S issues exclusively, the so-called 'skyddsombud'. Besides being involved in H&S-related management decisions, they may even stop work at their organisations immediately and ask H&S authorities to do inspections. The framework is based on the 1991 Work Environment Act, which stipulates a systematic H&S management approach comprising regular risk assessments within a process of continuous improvement. Steinberg (2013, p. 302) summarised:

> *"Every Swedish employer is obliged to follow an action plan of Systematic Work Environment Management. This includes maintaining a work environment policy, making risk assessments, allocating tasks with regard to health and safety, and drawing up and following a work environment action plan including follow-up routines."*

This process is to be completed in co-operation with the 'skyddsombud' (in the case of five or more employees) and should additionally be documented in writing for 10 or more employees. Frick and Johanson (2013) stated that the role of the 'skyddsombud' is still an important element in today's H&S management in Sweden. Several decades of co-determination in the field of H&S has established a convention according to which managers typically continue the dialogue with those union representatives despite a general trend of reduced union power. According to Frick and Johanson (2013), most employers did comply with the formal rules on H&S co-determination.

Managers perceived the national H&S authority 'Arbetsmiljöverket' as an enforcer that conducted regular inspections and focused on the outcomes of the overall H&S system. It was also considered a motivating and reminding influence. The authority made clear decisions, which were described as positive at S-3, S-4 and S-5. The H&S authority decided on interpretations of H&S rules and related exemptions. Regarding the latter, the H&S expert at S-3 stated storm 'Egon' of 10 January 2015 (interview, #00:25:30):

> *"They had a storm in the south of Sweden, a big storm and many trees fell down so they did an exception [regarding demanded trainings for chainsaws] just for that accident so they could put away all the trees that fell down."*

The enforcing and deciding role of the 'Arbetsmiljöverket' could be considered the result of historical developments, as described by Frick (2011). The Swedish government had decided in 1991 that the authority should focus on policing, after having been criticised for applying limited public resources to consulting private companies. Since then, inspectors have instructed managers and have taken binding decisions on specific applications of H&S rules. The commander of S-2 added that there was a considerable link between the 'Arbetsmiljöverket' and the trade unions, that is, the local 'skyddsombud' (interview, #00:46:20):

> *"If you go against them, you will also get the union because, as an employer, I could say that 'Arbetsmiljioverket' is very closely related to the union."*

Overall, the review of both the interview statements and the literature indicated that the Swedish H&S authority had a very strong position. The authority and its inspectors focused on enforcement and seemed to be closely linked to employee representatives. Thus, there was the obvious theme that Swedish managers pursued a formal co-determination approach to H&S management because of the substantial power of the national H&S authority 'Arbetsmiljöverket'. At the same time, the examples at S-2 and S-4 suggested that the resulting ways of implementing an HSMS were not effective because there was too strong a focus on governance. As the top managers at S-2 and S-4 were aware of the problems, they considered national H&S rules not helpful and saw a lack of firefighting knowledge at the H&S authority.

7.3.2 H&S management and regulation in Germany

There is no national H&S authority in Germany, but employers' liability insurance associations ('Berufsgenossenschaften' and 'Unfallkassen') and regional government agencies ('Gewerbeaufsicht') both act as H&S regulators (Deinert, 2013). Despite this heterogeneous structure, German interview participants had very similar views on their regulatory contexts. All of them reported that there were no regular inspections and that the infrequent visits of H&S authorities focused on buildings and equipment. An official accident analysis was only reported at D-4, but it had happened many years ago and was related to a deadly accident. With the exception of D-4, all interviewees mentioned that comprehensive information on H&S topics was provided. Overall, managers had positive experiences with H&S authorities, perceiving them as supportive and consultative. In Germany, inspectors seemed to act as informing and guiding advisors. This regulatory approach was confirmed by the study of Tilindyte (2011, p. 26), who found *"extremely low levels of formal enforcement"*. Similarly, a representative of the United Services Trade Union ver.di criticised that employees' working conditions were *"outside the law"* in Germany (Frank, 2014, p. 252).

Especially for emergency responses, there were no well-defined rules because working environments are unpredictable. Instead, behaviour-oriented H&S management was applied, with leadership being considered to be the main duty of managers. At D-2, this approach was supplemented with hands-on management decisions on H&S practices. Formal rule-based 'innovating' did not take place. Instead, firefighters were expected to decide on their own, as the vice-commander of D-5 described (interview, #00:57:40):

> *"That independent judgement on how far you deviate from the standard... The [one] does not see such a great danger, the other is more the fearful type. And that's where there are then very big differences… at some emergency sites."*
> *["Das selbst Einschätzen, wie weit weiche ich jetzt von der Norm ab… Der [eine] sieht keine so große Gefährdung, der andere ist mehr der ängstlichere Typ. Und da gibt es dann ganz große Unterschiede…bei manchen Einsatzstellen."]*

The vice-commander of D-5 also reported that he intervened if he thought certain actions were not appropriate from, for instance, an H&S perspective. Just like the top management of D-4, he considered such interventions to be the leadership duty of commanding fire officers. They provided a framework for firefighters without setting strict rules. This approach was also found in the German literature on firefighting. Südmersen and Cimolino (2014) described in their guidelines for indoor firefighting that firefighters often took higher risks than objectively acceptable. However, the authors emphasised that this behaviour should not be condemned, as it were part of the firefighting culture. In their view, firefighters should decide for themselves.

Obviously, in terms of the approaches to H&S management covered in this study, rule-based co-determination cannot work within the described culture of risk-taking. Thus, interview participants reported few, if any, risk assessments that had been conducted at their organisation. This was generally confirmed for German organisations by Schmitt-Howe (2018a, p. 171):

> *"But also the thin majority of German companies (54%) that do have a written risk assessment (RA) in most cases do not entirely comply with all legally prescribed steps of risk assessment process…"*

However, Schmitt-Howe (2018a) emphasised that there seemed to be a fundamental focus on H&S issues in the industry, as about 90% of organisations regularly instructed their employees in H&S procedures. Such instruction was also mentioned at all German fire departments in this study, either as formal training for regular work at the fire station or as immediate orders during emergency responses.

As depicted in Figure 7.1 the top managers of German fire departments took either a co-operation or a domination approach to H&S management. They acknowledged their responsibility, but rarely followed the formal rules of H&S authorities. It was generally observed that managers felt themselves responsible and acted independently. Especially in the case of economic constraints, they expected support from H&S authorities, as reported at D-4 and D-5. There were no well-defined organisational H&S rules, but a culture of hands-on decision-making predominated, as described at fire department D-2 in section 7.2.3, resulting in behaviour-oriented management approaches.

7.3.3 H&S management and regulation in the Netherlands

Jaspers and Pennings (2013) stated that the Dutch H&S authority ('Inspectie SZW', an agency of the Ministry of Social Affairs and Employment) was comparatively understaffed, which resulted in too few inspections. Therefore, they considered the initiative of employees and their representatives to be crucial. According to Jaspers and Pennings (2013), H&S rules were typically negotiated between employers and employees, either within organisations or at industry level. They stated that operational risk assessments should be conducted jointly by management and staff, then (in organisations with more than 25 employees) be formally approved by a certified health and safety officer. In certain industries, unions and employer associations had agreed on working conditions catalogues ('arbocatalogi'), which were then approved by the 'Inspectie SZW'. According to Jaspers and Pennings (2013), such negotiated rules were considered more effective than provisions of the national H&S authority. 'Brandweer Nederland' and relevant unions negotiated an 'arbocatalogus' for fire departments.

Dutch managers perceived their national H&S authority as an enforcement agency that focuses on rules and carries out inspections every few years. Negative experiences mentioned were a lack of knowledge and an authoritarian style. In these respects, the context was similar to Sweden, while it clearly differed from the supportive and consultative regulation in Germany. However, Dutch inspectors were open to discussions, while their Swedish counterparts provided clear decisions. The willingness to discuss H&S issues was also reflected in the descriptions of negative experiences at NL-2 and NL-5, where interviewees criticised inspectors for not giving clear answers on H&S issues but simply assigning final responsibility to top management. While the H&S expert at NL-5 was concerned that such practices might inhibit information exchange with H&S authorities, the commander of NL-2 even lost his respect for inspectors (interview, #00:37:10):

> *"When you get an inspector from the Minister [sic] here, they're just clowns. Puppets on a string.*"

Such limited respect might also be reflected in non-compliance with formal H&S rules. Blok (2017) mentioned the point of concern that Dutch fire departments did not conduct legally prescribed risk assessments despite being very active in developing and

implementing H&S measures for clean working at emergency responses. Indeed, in the past, Dutch inspectors had not explicitly asked for formal risk assessments if the overall H&S conditions at an organisation looked good (Graas, 2014). In January 2013, this regulatory approach was changed to stricter checks of documentation, which also implied more frequent fines. According to Graas (2014), the Dutch government wanted to encourage organisations to pursue more formalistic self-regulation for H&S issues.

The Dutch tradition of discussing H&S rules was confirmed by Rothstein *et al.* (2015, p. 13), who stated that authorities focused on dialogue about suitable H&S measures:

> *"While there is little formal scope for discretion on the application of specific duties, inspection cultures tend to favour pragmatic and non-legal negotiated solutions.*"

The identified ways of implementing an HSMS at NL-3 and NL-4 seemed to reflect this regulatory approach. As described at the beginning of section 7.3, both fire departments used non-binding H&S rules to improve operational H&S conditions. Firefighters were to be convinced to act in safer ways. The commander of NL-4 emphasised that firefighters learned from experience (interview, #00:45:35):

> *"Fire departments are really experienced-based for how they learn: they must experience. Because you can say it on paper, and they think, 'Yeah, hm, nice', but they really have to try it… So, we're really looking for exercises where you try this.*"

Thus, Dutch fire departments seemed to develop well-defined rules as a basis for discussion. The rules might be developed at the organisation itself (decided by top management as at NL-4) or they might be transferred from other organisations with no detailed decisions having been made, as was the case at NL-3. As information was continuously shared between managers and employees, the step towards a focusing approach to H&S management could be considered smaller than in the case of Swedish co-determination or German domination. As a result of continual negotiation with employees and inspectors, Dutch managers seemed to be used to elements of both governance- and behaviour-oriented ways of implementing an HSMS.

7.4 Conclusions on the first cross-case analysis

Basic approaches to H&S management were developed by grouping the individual ways of implementing an HSMS identified in Chapter 6. Additionally, managers' regulatory perceptions were investigated by analysing their answers to the interview questions on their experiences with H&S authorities. The context-driven cross-case analysis revealed that there were two general behavioural characteristics according to which the fire departments could be grouped.

First, the 'formalistic organisations' were governance oriented and typically adopted the co-determination approach. They tended to have comprehensive H&S rules that top management and employees elaborated together, but that were limited in their effectiveness due to the absence of H&S motivations in day-to-day work. Second, 'pragmatic organisations' were behaviour oriented and typically adopted the co-operation and domination approaches. Their H&S management was mainly based on informal information exchange between top management and employees, resulting in day-to-day H&S engagement without the specific rules needed for effective H&S innovations. The country cases demonstrated national preferences, that is, co-determination was most common in Sweden, domination was typical in Germany and co-operation fitted Dutch managers.

The most effective approach to H&S management, namely focusing, was adopted in all kinds of organisations in all three countries. Being both governance and behaviour oriented, it corresponded to change projects that managers pursued to improve specific H&S conditions. Based on the analyses of Chapter 7, the diverse ways of implementing an HSMS in different organisational and regulatory contexts can be described as four basic approaches to H&S management.

Chapter 8
Typology of Managers' H&S Motivations
(Second Cross-Case Analysis)

In the second cross-case analysis, managers' H&S motivations were investigated as the independent variable of the research question. Based on the literature review, it was assumed that their motivations determined their engagement in H&S practices (section 2.6). Motivation statements of interviewees were therefore coded in relation to the identified ways of implementing an HSMS. The relationship between categories of H&S motivations and approaches to H&S management (Chapter 7) was investigated with reference to organisational contexts. Additionally, motivation differences between countries were reviewed with respect to the national approaches to H&S management and regulation identified in section 7.3. The cross-case analyses were then combined to address the final research objective, that of developing a typology of managers' H&S motivations in their managerial and regulatory context.

8.1 Coding of managers' H&S motivations

Motivations were coded by quoting notable statements by interviewees on their reasons for implementing an HSMS in a certain way. The identified text passages (see Appendix E) were sorted into categories by first focusing on the quote itself and then considering the context. The motivation statements were categorised through cross-case comparison. The outcome reflects the characteristics of the interview data and deviates considerably from the findings of the literature review (section 4.3). Contrary to what the latter suggested, interviewees did not mention a motivation for using the H&S information of authorities. At the same time, statements that could have been assigned to the originally anticipated category 'manager performance/reputation' were instead assigned to either 'power of formal rules' (such as performance evaluations based on H&S rules) or 'power of informal rules' (such as peer pressure affecting H&S reputation), because the resulting categorisation was considered more consistent. The social-context category of 'moral and personal' motivations was additionally developed from the interviews. The five identified categories of managers' H&S motivations are described below.

8.1.1 Motivation category 'limited resources and savings'

The motivation category 'limited resources and savings' was considered separately because the analyses in Chapter 7 revealed that, especially in Germany, fire departments' budgets seemed to be constrained. The researcher had visited some very old fire stations (especially D-4 and D-5) and identified corresponding interview statements at D-2 and D-3 (section 7.1). Therefore, it was investigated whether such budget constraints represented motivations for (reduced) H&S activities. Interviewees did indeed state that a lack of money or personnel affected their decisions on H&S measures. This category was also defined because the literature review had indicated that economic pressure might promote informal safety cultures rather than formal HSMSs (section 2.4).

8.1.2 Motivation category 'overall performance and safety'

The economic motivation of 'overall performance and safety' was mentioned in almost all descriptions of HSMS models. Managers aimed at creating benefits for their organisations. During the coding process, all statements on good business performance and positive H&S conditions were assigned to this category. In this way, different views on performance were summarised. For example, the vice-commander of D-5 focused on firefighters' ability to extinguish fires (interview, #00:05:00):

> *"We are not the ones who are afraid there, who stay outside and always only say: no, I always want total safety. Then we would not extinguish fires so well, and we also could not rescue people so quickly…"*
> *["Wir sind nicht die, die Angst jetzt da haben, um draußen stehen zu bleiben und immer nur sagen: nein, ich bin immer nur auf totale Sicherheit aus. Dann würden wir das Feuer nicht so gut bekämpfen und wir würden auch nicht so schnell eine Menschenrettung durchführen können…"]*

A contrasting example was the HSMS description of the H&S expert at NL-3. He emphasised that the procedures, called *"management of change (MOC)"*, were

implemented in order to prevent risks that could be incurred without sufficient analysis. Such statements created the impression that commanders and H&S experts might have different perspectives on H&S issues: the former thought of overall performance while taking safety issues into account, the latter focused on H&S in the context of overall performance. Such variations in focus reflected the different organisational roles of the two groups of interviewees. However, their underlying motivations were considered similar, and were therefore summarised in one category.

8.1.3 Motivation category 'power of formal rules'

The 'power of formal rules' was mentioned as a motivation at all fire departments. National laws and regulations as well as local municipalities' H&S rules were described as a basis for the organisational ways of implementing an HSMS. This coding category comprised all the external pressures related to written H&S rules. Similarly, statements on formal organisational procedures were assigned to this category because they were the result of top-down decisions and thus represented pre-defined rules for H&S activities. The typical motivation could be described as the duty to comply with defined rules. The H&S expert at S-5 described this with respect to municipal guidelines for H&S management (interview, #00:02:40):

> *"This list is something that the municipality had for quite some years and we have to comply with it, because it follows the Arbetsmiljöverket's rules. And they have made this plan out of all the regulations, the rules from Arbetsmiljöverket [the national H&S authority]."*

8.1.4 Motivation category 'moral and personal'

The category 'moral and personal' motivations summarised all statements relating to care for employees and a sense of individual responsibility. Care was expressed as feelings of duty toward, and personal relationships with, employees. Interviewees also described specific responsibilities of managers and employees. In the view of most interviewees, all employees had a certain responsibility to ensure good H&S conditions.

This also implied that employees were granted the right to make decisions on their own. Especially in the context of ongoing operations, top managers at German (D-2, D-4, D-5) and Dutch (NL-2 and NL-4) fire departments emphasised that firefighters were allowed to refuse orders and act in contradiction to H&S rules. The commander of NL-4 stated (interview, #00:04:20):

> *"So, they can ignore the commanding chief on the truck because they have an opinion about their own health and safety. In the way you use your materials and your equipment, there is a responsibility for the organisation, but there is also a big responsibility for the user themselves."*

Such statements on the responsibilities of employees were also identified in Sweden, but they were less frequent and less explicit. The commander of S-2 explained that there used to be a strict line of command in Swedish firefighting, and the H&S expert of S-4 emphasised that, even today, following the rules is *"strongly recommended"* (interview, #00:41:40). Swedish managers appeared to focus more on 'power of formal rules' than on 'moral and personal' motivations. Compared with their German and Dutch counterparts, they seemed more likely to ascribe H&S responsibility to the organisation as a whole rather than to individual employees. These kinds of fundamental judgements on responsibilities and duties, with no reference to external forces or organisational performance, defined the category of 'moral and personal'.

8.1.5 Motivation category 'power of informal rules'

Informal rules mainly referred to peer pressure and individual reputation, which were mentioned as motivations in section 4.3. During the interviews, managers said that they were expected to act in certain ways because others did so. There was no moral judgement or reference to people's safety, which would be typical for the 'moral and personal' category. Instead, managers responded to the behaviour of employees based on feelings of pressure and obligation, as illustrated by comparing the interviews with the H&S experts at D-4 and D-5. The former mentioned that young colleagues were an inspiration at the organisation, which was coded as motivation by 'power of informal

rules'. The latter mentioned that young employees informed the organisation about the latest H&S rules, which was coded as 'power of formal rules'. Thus, the same young colleague could motivate top management in two different ways, either by acting in accordance with the H&S practices they had just learned during their initial training, or by informing management about those same rules.

8.2 Statistical analysis of categorised motivation statements

From the country cases in section 7.3, in which management practices and regulatory approaches were compared, three national themes were developed with respect to characteristic HSMSs for ongoing operations:

- Germany: Hands-on decision-making and behaviour-oriented leadership prevailed, and managers acted independently, as formal H&S rules were hardly enforced by authorities. Thus, the most common approach to H&S management was domination.
- Sweden: Managers typically implemented HSMSs based on detailed rules and governance orientation because the H&S authority enforced a formal HSMS with regular inspections and strong power. Thus, the main approach to H&S management was identified as co-determination.
- The Netherlands: Managers implemented HSMSs with both governance- and behaviour-oriented elements, and they negotiated with employees and inspectors, as the H&S authority was open to discussions. Thus, the most frequent approaches were focusing and co-operation.

The national themes indicated that the varying regulatory approaches affected managers' ways of implementing an HSMS. Accordingly, three out of four Swedish fire departments were considered formalistic, while three out of four German fire departments were deemed pragmatic (section 7.1). Among the Dutch participants, there were two formalistic organisations and two pragmatic ones. In light of these national differences, it was investigated whether motivations varied between formalistic and pragmatic organisations. As shown in Table 8.1, there was no significant difference between the frequencies of motivation statements at formalistic and pragmatic organisations.

Table 8.1

Frequencies and proportions of motivation statements at pragmatic and formalistic organisations

Motivation categories	**Pragmatic organisations** 6 fire brigades, 15 ways of implementing an HSMS		**Formalistic organisations** 6 fire brigades, 15 ways of implementing an HSMS	
Limited resources and savings	13	11%	7	7%
Overall performance and safety	41	35%	36	35%
Power of formal rules	27	23%	27	26%
Moral and personal	21	18%	22	22%
Power of informal rules	16	13%	10	10%
Total	*118*	*100%*	*102*	*100%*

For each group of fire departments, more than 100 motivation statements were identified in the interviewees' descriptions of ways of implementing an HSMS. The frequency of the 'overall performance and safety' motivation was very similar in both groups, comprising 35% of all quotes. This category represented the most common motivation. 'Power of formal rules' and 'moral and personal' were second and third in their frequencies, and they were also equally distributed between the two kinds of fire departments. The less frequent motivations 'power of informal rules' and 'limited resources and savings' displayed considerable differences. At pragmatic organisations, the former was mentioned 60% more often (16 times versus 10 times) and the latter was mentioned 86% more often (13 times versus 7 times), though the numbers of HSMS descriptions and case organisations were the same for pragmatic and formalistic organisations. The difference in the 'power of informal rules' was small in absolute terms, but this might be explained by the general characteristics of pragmatic

organisations relying less on formal rules than formalistic organisations. The data on 'limited resources and savings' corresponded to the literature, which indicated that economic constraints should lead to less formal ways of implementing an HSMS (section 2.4).

The similar H&S motivations at formalistic and pragmatic organisations were surprising because they suggested that pragmatic managers who did not follow the rules on legally defined HSMSs (section 7.1) still felt the same 'power of formal rules' as their formalistic counterparts. From the inverse distribution of German and Swedish nationalities in the two groups of organisations (the former mostly pragmatic, the latter mostly formalistic), it could be assumed that similar motivations existed in these two countries. In the Netherlands, in contrast, H&S motivations could be either similar to or divergent from the others, as two Dutch fire departments were pragmatic and two were formalistic. Therefore, H&S motivations by country were identified as presented in Table 8.2.

Table 8.2

Frequencies and proportions of motivation statements by country

Motivation categories	**Germany** 4 fire brigades, 10 ways of implementing an HSMS		**Netherlands** 4 fire brigades, 10 ways of implementing an HSMS		**Sweden** 4 fire brigades, 10 ways of implementing an HSMS	
Limited resources and savings	12	15%	3	4%	5	7%
Overall performance and safety	19	23%	25	37%	33	46%
Power of formal rules	26	32%	12	18%	16	23%
Moral and personal	13	16%	19	28%	11	16%
Power of informal rules	11	14%	9	13%	6	8%
Total	*81*	*100%*	*68*	*100%*	*71*	*100%*

Based on Table 8.2, it was concluded that 'limited resources and savings' was a motivational category that mostly applied to Germany. Of the 20 associated statements, 12 were identified there. This finding corresponded well with the researcher's observation that the German fire stations were older and less well equipped than their Dutch and Swedish counterparts (with the exception of certain fire engines). The predominantly pragmatic behavioural contexts in Germany also pointed towards economic constraints (section 7.1). At each German fire department, between two and four statements on 'limited resources and savings' were identified, yielding 12 in total. In the Netherlands and Sweden, the total numbers of such statements were three and five, respectively. These low frequencies suggested that no meaningful statistical analysis was possible with respect to this motivation category. Therefore, 'limited resources and savings' as a motivation was not considered in subsequent analyses. After excluding associated quotes, the numbers of motivation statements were very similar in the three countries, that is, between 65 and 69 each. Thus, a set of four motivation categories, comprising 200 statements in total, was used for the further investigations.

As shown in Table 8.2, 'overall performance and safety' was the most common motivation in the Netherlands and Sweden. The frequency of such statements was about a third higher in the Netherlands than in Germany, and another third higher in Sweden than in the Netherlands. Regarding the very high value in Sweden, it might be assumed that Swedish interviewees wanted to emphasise that their individual HSMS models, which they had chosen to describe in their interviews, were more effective than the H&S measures stipulated by the Swedish authority 'Arbetsmiljöverket'. Regarding the discrepancy between Germany and the Netherlands, it was found that mainly the interviews with H&S experts yielded the observed difference. Only 15% of the corresponding motivation statements from all H&S experts originated from Germans. If they had given similar answers as their commanders, the frequencies of statements on 'overall performance and safety' in Germany and the Netherlands would have been almost equal. It might be assumed that German H&S experts did not want to judge the H&S measures their commanders had ultimately decided on. Overall, the national variations in the 'overall performance and safety' motivation indicated that there were different perspectives on H&S management, but they did not suggest implications for managers' practices.

Comparing national motivations according to Table 8.2 and regulatory practices according to section 7.3 revealed that the 'power of formal rules' was mentioned most often in two very different regulatory environments: Germany and Sweden. It was originally expected that managers would mention this motivation if regulators acted as police. This was the case in Sweden where commanders generally emphasised the importance of authorities' rules. However, the data indicated that non-enforcing regulators, such as the German H&S authorities, generated such motivations, too. Indeed, formal rules were mentioned most often in Germany, particularly by H&S experts. The Dutch inspectors, in contrast, who were open to discussion, seemed to promote motivations in the category of 'moral and personal'. This was found approximately 50% more often in the Netherlands than in Germany and Sweden. The uneven distribution of the statements on 'power of informal rules' basically reflected the distribution of formalistic and pragmatic organisations among the countries. This motivation category was mentioned more often at the mostly pragmatic fire departments in Germany than at the mostly formalistic counterparts in Sweden. In the Netherlands, where pragmatic and formalistic organisations equally occur, mainly the commanders mentioned the 'power of informal rules'. Apparently, the open discussions with inspectors also promoted feelings of peer pressure and individual reputation at the top organisational level.

Analysing the data in Table 8.2 revealed the relationships between managers' H&S motivations and their national regulatory environments. These findings were combined with the previously developed national themes on characteristic HSMSs and regulation (section 7.3). As a result, suggestions for relationships between managers' motivations and their approaches to H&S management emerged. For example, it could be assumed that both the mostly German approach of domination and the mostly Swedish approach of co-determination were positively correlated with the 'power of formal rules' as a motivation. The higher share of 'moral and personal' motivation in the Netherlands suggested that this category was related to the focusing and co-operation approaches, which were adopted more often there.

The above discussion shows how managers' ways of implementing an HSMS were related to the frequencies of their statements on H&S motivations. The data are summarised in Table 8.3.

Table 8.3

Frequencies and proportions of motivation statements by approach to H&S management

Motivation categories	Co-determination 5 fire brigades, 10 ways of implementing an HSMS		Focusing 9 fire brigades, 10 ways of implementing an HSMS		Co-operation 4 fire brigades, 4 ways of implementing an HSMS		Domination 5 fire brigades, 6 ways of implementing an HSMS	
Overall performance and safety	24	38%	27	42%	9	30%	17	41%
Power of formal rules	21	33%	12	18%	7	23%	14	33%
Moral and personal	11	18%	18	28%	8	27%	6	14%
Power of informal rules	7	11%	8	12%	6	20%	5	12%
Total	*63*	*100%*	*65*	*100%*	*30*	*100%*	*42*	*100%*

The figures in Table 8.3 confirmed previous suggestions. The specific numbers of statements on the 'power of formal rules' were indeed higher for the co-determination and domination approaches. Likewise, 'moral and personal' motivations were mentioned more often during descriptions of focusing and co-operation approaches. In contrast, mentions of 'overall performance and safety' were quite evenly distributed among the approaches to H&S management, especially if the two pragmatic approaches of co-determination and domination were combined. The share of statements was always about 40%. Similarly, the shares of the 'power of informal rules' were always around 12%. Thus, no significant differences between the management approaches were identified with respect to these two motivation categories.

With reference to Table 8.3, it was concluded that the statements reflecting 'power of formal rules' and 'moral and personal' motivations were almost inversely distributed between the management approaches of co-determination and domination on the one hand and focusing on the other. For the former two management approaches, the share

of statements indicating motivation by the 'power of formal rules' was 33% each, while the share of those indicating 'moral and personal' motivations was 17% and 14%, respectively. For focusing, in contrast, the share of the 'power of formal rules' statements was only 18%, while the share of 'moral and personal' motivations was 28%. Regarding co-operation, the two motivations had quite similar shares, at 23% and 27%, respectively. Thus, the 'power of formal rules' was the most frequently cited motivation for two approaches to H&S management, and 'moral and personal' was the most common motivation for the other two approaches.

The following analysis therefore focused on the motivation categories of 'power of formal rules' and 'moral and personal', which displayed considerable differences. These two categories comprised about half of all the remaining motivation statements, that is 97 quotes. Regarding the two motivation categories 'power of formal rules' and 'moral and personal', the significance of the differences in frequencies was investigated by means of a chi-square test; see Table 8.4.

Table 8.4

Chi-square test for two categories

of motivation statements by approach to H&S management

Motivation categories	**Co-deter-mination** observed (expected)	**Focusing** observed (expected)	**Co-operation** observed (expected)	**Domination** observed (expected)	**Total**
Power of formal rules	21 (18)	12 (17)	7 (8)	14 (11)	*54*
Moral and personal	11 (14)	18 (13)	8 (7)	6 (9)	*43*
Total	*32*	*30*	*15*	*20*	*97*

Total chi-square value = 6.43

Chi-square distribution with three degrees of freedom: 6.40 for $p = 0.094$
Chi-square distribution with three degrees of freedom: 6.50 for $p = 0.090$
Thus, $p = 0.093$

Critical chi-square value with three degrees of freedom: 6.25 for $p = 0.100$
Thus, difference in motivations identified at the 90% level of confidence

The overview of the chi-square calculations in Table 8.4 shows relatively small figures, especially for the less frequently observed approaches of co-operation and domination. Nevertheless, the data were still considered sufficient for a meaningful statistical analysis. In accordance with general recommendations, expected values were at least five. Additionally, the two motivation categories had very different characteristics, describing either an extrinsic motivation from regulatory forces or an intrinsic motivation from personal feelings. Applying a chi-square test to the distributions of statements on 'power of formal rules' and 'moral and personal' motivations yielded a *p*-value of 0.093. The total chi-square value of 6.43 was greater than the critical value of 6.25 according to the chi-square distribution with three degrees of freedom. Thus, a significance level of 10% was achieved for rejecting the hypothesis that the two distributions did not differ. Accordingly, there was a difference in motivations at the 90% level of confidence. Due to the relatively small number of observations, the identified difference in the distributions of the two motivation categories were considered well substantiated.

Applying the chi-square test by column, that is, to the approaches to H&S management, allowed for a significance level of 5%. It could be rejected that 'power of formal rules' and 'moral and personal' motivations did not differ between co-determination and focusing and between domination and focusing (both comparisons yield *p*-values of 0.04). In contrast, the motivations for co-operation were apparently similar to those for focusing (reflected in a *p*-value of 0.67). The statistical analysis confirmed the impression from Table 8.3 that there were two kinds of motivations that were related to specific management approaches.

8.3 Resulting typology of managers' H&S motivations

The final objective of this study was to develop a typology of managers' H&S motivations in their managerial and regulatory context. Groups of managers were to be identified based on what they stated as their motivations when describing their specific ways of implementing an HSMS. As the analysis in section 8.2 showed, two kinds of motivations were identified, and these resulted in different approaches to H&S management.

For co-determination and domination, it was observed that the 'power of formal rules' was mentioned about twice as often as 'moral and personal' motivations (Table 8.4). Thus, the former motivation clearly dominated when these two approaches to H&S management were adopted. As reflected in the country cases (section 7.3), co-determination was most common in Sweden, while domination was a typically German approach to HSMS implementation. In both cases, management practices were related to the typical characteristics of national regulation. As presented in Table 7.3, Swedish inspectors focused on system outcomes, while German authorities looked at buildings and equipment. In order to meet these regulatory demands, a Swedish manager was expected to implement a systematic HSMS with decision-making processes that involve employees and take their views on operational procedures into account. Thus, co-determination would be the right approach. A German manager, on the other hand, should mainly ensure that the buildings and equipment are in good shape, which would not require a formal HSMS. Instead, the commander and H&S expert(s) in an organisation could simply complete their own technical inspections as authorities would do, disregarding employees' operational views and experiences. The corresponding approach for this is domination. The comparison of the typical management approaches and regulatory contexts in Sweden and Germany explained why motivation by the 'power of formal rules' resulted in very different approaches to H&S management. Those ways of implementing an HSMS that met the perceived demands of H&S authorities were applied. Although managers' regulatory perceptions were also affected by their cultural contexts (section 7.3), the laws and rules that H&S authorities promoted directly influenced organisational H&S practices. This type of managerial motivation was therefore called 'Law Managers'.

Focusing and co-operation were related to more frequent statements implying 'moral and personal' motivation. These two approaches to H&S management and this motivation category were observed more often in the Netherlands than in Germany and Sweden. As described in the country cases in section 7.3, Dutch managers seemed to be used to continual negotiation with employees and inspectors. The authorities conducted regular inspections (unlike in Germany), but did not provide clear decisions (unlike in Sweden). Instead, inspectors conducted open and result-oriented discussions. Authorities' activities could be characterised as a combination of regular visits and negotiated rules. This regulatory approach forced managers to repeatedly discuss and communicate their views on H&S management. Apparently, such conversations

promoted ‘moral and personal’ motivations. For the focusing approaches in the Netherlands, statements in this motivation category were mentioned five times as often as those in the ‘power of formal rules’ category (that is, 10 statements versus two). Additionally, the negotiated H&S rules were expected to support alternative approaches to HSMS implementation, such as focusing or co-operation, because inspectors consented to corresponding deviations from legal requirements. Although such consent did not reduce top management’s liability, it still encouraged Dutch managers to adopt those approaches to H&S management.

Focusing was related to more frequent statements involving ‘moral and personal’ motivation in Germany and Sweden, too. While the ‘power of formal rules’ was the predominant motivation for both co-determination and domination, it was supplemented by ‘moral and personal’ motivations for focusing. In Sweden, the ratio of statements reflecting ‘moral and personal’ motivation and ‘power of formal rules’ was 0.55 for co-determination, that is, ‘moral and personal’ topics were described six times while formal rules were mentioned 11 times. However, the ratio was 0.80 for focusing, corresponding to four and five statements, respectively. In Germany, the frequency ratios of the two motivation categories were 0.60 (that is, six versus 10 statements) for domination and 0.80 (that is, four versus five statements) for focusing. Thus, the number of statements reflecting the two kinds of motivations was fairly equal for focusing in Germany and Sweden. This is also true in terms of the total statements for co-operation (Table 8.4), which could not be analysed at national level due to the small sample size. Because of the largely equal frequencies of statements reflecting the two motivations for focusing and co-operation, the second type of managerial motivation was called ‘Law & People Managers’.

8.4 Conclusions on the second cross-case analysis

The developed typology of managers’ H&S motivations in their managerial and regulatory context comprised two groups: Law Managers and Law & People Managers. The Law Managers aimed at compliance with H&S rules. Their approaches to H&S management varied according to the regulatory activities of national H&S authorities. The driver for organisational H&S activities was motivation by the ‘power of formal rules’. The systematic focus of the Swedish H&S authority ‘Arbetsmiljöverket’ resulted

in co-determination, while the technology focus of German inspectors promoted domination. This type of manager was less common in the Netherlands, where authorities were perceived to be more open to discussions on deviations from legally prescribed H&S rules.

The second type of manager, Law & People Managers, tried to combine compliance with their feelings of moral responsibility and care for employees. Law & People Managers seemed to be most common in the Netherlands, though they also existed in Germany and Sweden. Their preferred approaches were focusing and co-operation. These approaches were applied in all regulatory environments because managers did not limit their attention to authorities' demands, but also considered their employees' interests when implementing appropriate organisational HSMSs. Continual negotiation with employees and authorities in the Netherlands seemed to promote such management practices and the related 'moral and personal' motivations.

Chapter 9

Overall Conclusions and Discussion in View of the Literature

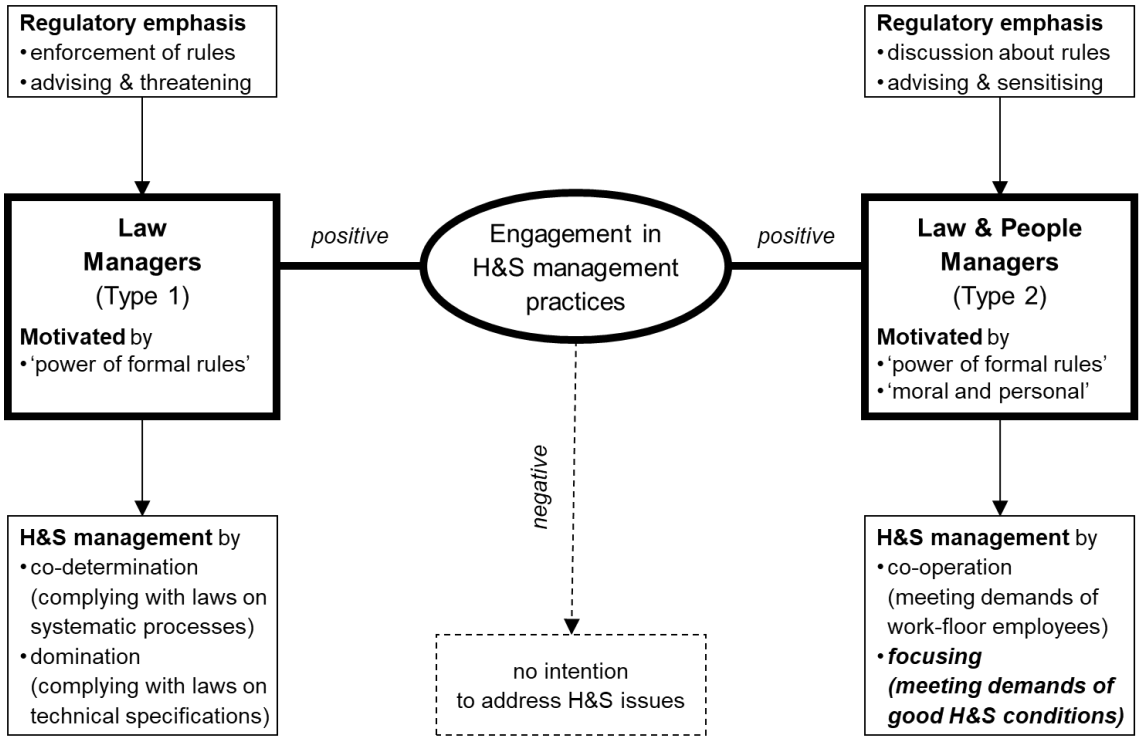
In accordance with the qualitative research approach of Eisenhardt (1989), this study's findings on H&S motivations, management practices and regulation are discussed in view of the literature. This discussion is not limited to the literature review that was used for justifying the research question, aim and objectives (Chapter 2). The findings are, on the contrary, compared with literature that presents similar, conflicting or complementary results. Thus, following the recommendation of Eisenhardt (1989), an additional literature review is presented with reference to the conclusions of the previous Chapters. This is typical for inductive case study research (Yin, 2014). Correspondingly, section 9.1 summarises how the typology of managers' H&S motivations was developed. The two types of H&S motivations are then considered with respect to literature that reflects the identified approaches to H&S management (section 9.2) and regulations by H&S authorities (section 9.3).

9.1 Summary of findings in light of research question, aim and objectives

It is now explained how the study's research objectives were achieved in order to answer the research question and meet the research aim. Figure 9.1 presents the identified typology of managers' H&S motivations as the ultimate outcome of the research process. Two types of managers are distinguished with reference to their H&S motivations. They are related to different regulatory emphases and managerial H&S practices. With it, it is explained how and why H&S regulators determine top managers' ways implementing HSMSs. Figure 9.1 may therefore provide guidance to authorities on the appropriate approaches to addressing H&S issues in their communication with top managers. If rule enforcement is supplemented by open discussions, promoting moral and personal motivations among top managers, the demands of good H&S conditions will be in the focus of H&S management. The resulting HSMSs will not be limited to compliance, but they will take the interests and ideas of employees into account. This new managerial perspective on H&S can improve communication between managers and authorities, and it can hence facilitate optimal H&S management in individual organisations.

Figure 9.1

Identified typology of managers' H&S motivations (developed by the author)



9.1.1 Answer to the research question and achievement of the aim: how are top managers' ways of HSMS implementation affected by their H&S motivations in different regulatory environments?

Figure 9.1 answers the research question by showing how top managers' ways of implementing an HSMS are affected by their H&S motivations in different regulatory environments. It reveals that the two identified types of managers pursue H&S management by different means. Law Managers ensure compliance with regulatory demands through either co-determination or domination. Law & People Managers take the views of their employees into account to optimise H&S conditions through either co-operation or focusing. Managers' underlying H&S motivations and the associated regulatory strategies H&S authorities use to promote them are depicted as determinants in Figure 9.1. Overall, the typology provides a comprehensible and useful answer to the research question. The focusing approach to H&S management is marked in bold because, based on the literature review, it is assumed to be the most effective in satisfying the requirements for good H&S conditions. It is supported by a regulatory

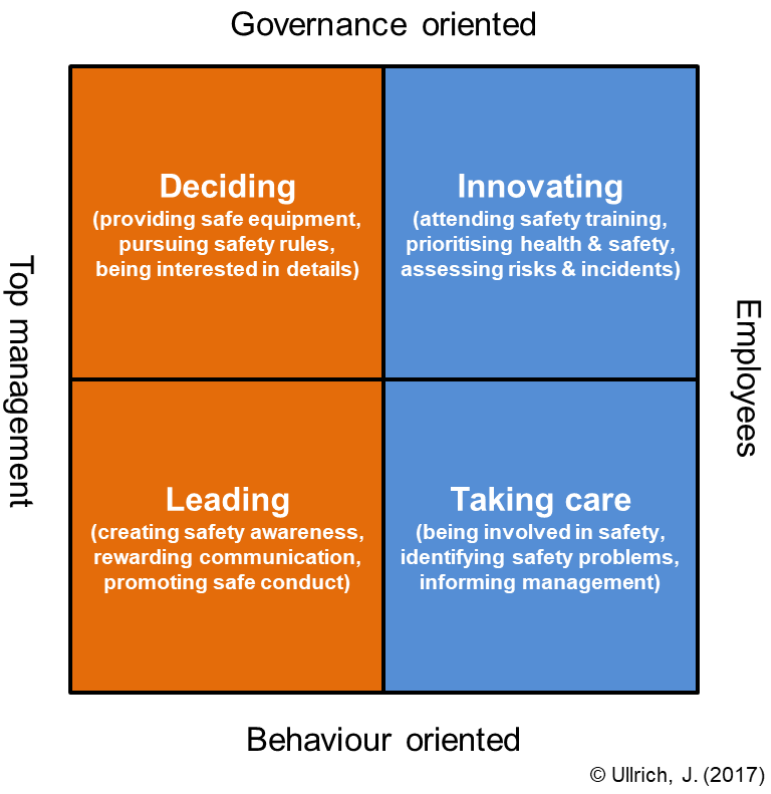
emphasis on advising and sensitising, which implies open and result-oriented discussions about H&S rules. Answering the research question also achieves the research aim: to identify how top managers' ways of implementing an HSMS are affected by their H&S motivations in different regulatory environments.

9.1.2 Achievement of the first research objective: to codify top managers' ways of implementing an organisational HSMS

Top managers' ways of implementing an HSMS were initially described in order to achieve the first research objective. A large variety of managerial practices were identified (Chapter 6) and characterised with reference to the HSMS model of this study. The four elements of an effective HSMS were discussed with all interviewees. During the within-case analyses, only the description of 'innovating' was slightly adjusted. Instead of claiming that employees assess 'hazards', as stated in Figure 2.7, it was now clarified that their assessment covers 'risks & incidents', as shown in Figure 9.2. This represents an empirically tested model for analysing organisational HSMSs.

Figure 9.2

Revised elements of an effective HSMS (developed by the author)



Based on a context-focused cross-case analysis, the individual ways of implementing an HSMS were categorised into four approaches to H&S management (sections 7.1 and 7.2). The four resulting categories are co-determination, domination, co-operation and focusing. Top managers of formalistic organisations typically apply co-determination, while domination and co-operation prevail at pragmatic organisations. Focusing is applied in both environments. The interview data unexpectedly revealed that top managers use focusing mostly in operational change projects rather than in the organisational contexts of ongoing operations and high-level decisions.

9.1.3 Achievement of the second research objective: to codify top managers' perceptions of H&S authorities' regulatory approaches

The second research objective was achieved through the development of country cases that focused on managers' perceptions of H&S authorities' regulatory approaches (section 7.3). The interviewees' statements on regulatory contexts were codified and compared with the literature. In all countries, interviewees reported that the individual H&S authorities focus on their H&S rules and that these rules are perceived to be not helpful. In terms of national differences, German and Swedish authorities focus on advising and threatening, which reflects a policing approach, while Dutch inspectors prefer to advise and sensitise (Figure 9.1). Also, inspections are very infrequent in Germany, while they occur regularly in the Netherlands and Sweden. Similar descriptions of country characteristics can be found in the literature, but there have been no specific studies on national differences. Thus, the outcomes of the analysis for the second research objective are essential with respect to the regulatory environment mentioned in the research question.

9.1.4 Achievement of the third research objective: to codify the H&S motivations of top managers

As described in section 8.1, the third research objective was achieved by quoting notable interview statements on reasons for applying certain H&S management practices. The initial codes of H&S motivations were directly related to ways of implementing an HSMS. The categorisation of motivation statements was subsequently

done through cross-case comparison. The resulting five categories of H&S motivations provide reasons for top managers' organisational HSMS choices. They are based on the data from the 24 interviews with the (vice-) commanders and H&S experts at the fire departments and, therefore, represent substantiated descriptions. Thus, the achievement of the third research objective lays the foundation for developing the typology of managers' H&S motivations.

9.1.5 Achievement of the fourth research objective: to identify relationships between managers' ways of implementing an HSMS and their H&S motivations in different regulatory environments

The relationships between managers' ways of implementing an HSMS and their H&S motivations were investigated in section 8.2. Statistical analyses were performed by counting and evaluating the number of motivation statements by managerial approach. The five categories of H&S motivations were related to the four approaches to H&S management, which in turn were considered with reference to the country cases (section 7.3). The surprising finding was that no motivational differences were identified between formalistic and pragmatic organisations, that is, between those managers who try to follow the letter of the law (particularly common in Sweden), and those who independently decide on H&S measures (particularly common in Germany). However, the focusing approach – and to a lesser degree co-operation – is related to an increased relevance of 'moral and personal' motivation as compared with the 'power of formal rules'. This is most obvious in the Netherlands, where inspectors are open to discussing H&S rules rather than focusing on policing.

9.1.6 Achievement of the final research objective: to develop a typology of managers' H&S motivations in their managerial and regulatory context

As presented in section 8.3, the final research objective was achieved by distinguishing between the two prominent motivational settings. On the one hand, there is the positive engagement of Law Managers, who are predominantly motivated by the 'power of formal rules'. On the other hand, there are Law & People Managers, who report being driven by both 'power of formal rules' and 'moral and personal' motivations. These

two types of managers adopt different approaches to H&S management in the varying regulatory contexts of the three countries. The 'power of formal rules' is most relevant for co-determination and domination, which are often found under the policing regulators in Germany and Sweden. The 'moral and personal' motivations are additionally mentioned for co-operation and focusing, which are more frequent in the Netherlands, where inspectors are willing to discuss H&S rules. Integrating the findings from Chapters 6 to 8, the typology of managers' H&S motivations provides a framework for describing managers' H&S motivations in their managerial and regulatory context.

9.2 Managers' H&S motivations and approaches to H&S management

The literature review showed that managers' H&S engagement is based on legal, economic, and social-context motivations (section 2.6). The social-context motivations were described in a variety of forms, such as moral duty, benchmarking, performance evaluation, reputation and supply-chain pressure. According to this study, the decisive difference between managers was their sense of moral duty (section 8.3). Statements reflecting 'moral and personal' motivations were mentioned significantly more often when managers pursued a focusing or co-operation approach. In these cases, the 'power of formal rules', that is, legal motivations, were still relevant, but were less prominent than in cases involving co-determination and domination. For the other motivations, no significant variations were observed in terms of approaches to H&S management. Therefore, it is concluded that two types of managers' H&S motivations should be distinguished. First, Law Managers aim at meeting legal requirements with top-down decision-making, either with formalistic consultation of employees (that is, co-determination) or without employee involvement (that is, domination). Second, Law & People Managers discuss matters with employees and other stakeholders in order to ensure optimal H&S conditions. Their approaches of focusing and co-operation may be more time-consuming, but they tend to cover more elements of an effective HSMS according to the model of this study (Figure 2.7).

The focusing approach to H&S management addresses both the governance-oriented practices of formal (sometimes certified) systems and behaviour-oriented practices for operational implementation. The importance of both kinds of HSMS elements in

creating good H&S conditions was recently confirmed by Casey *et al.* (2017), who reviewed the available literature on the underlying concept of safety climate. They found that meta-analyses had shown that safety climate was positively associated with safety behaviour, which in turn was negatively associated with accident rates. Management commitment, in particular, was found to be predictive of future accidents. According to their review, for proactive H&S management, a safety climate had to feature *"safety recognition… and planning practices"* and *"employee consultation and involvement practices"* (Casey *et al.*, 2017, p. 348). These categories were similar to those in Figure 2.7, which was developed from the safety climate model of Vinodkumar and Bhasi (2010). Open and comprehensive communication on H&S issues was a pre-requisite for all those elements. In line with the assumption of this study, Casey *et al.* (2017) proposed that safety climate could be used as a managerial control mechanism, while safety culture was a more general organisational characteristic. Thus, a complete HSMS ought to be implemented in such a way that all elements of an effective safety climate are addressed, following the focusing approach.

Hale and Borys (2013a, 2013b) suggested that linking formal H&S rules and practical behaviours would create optimal H&S conditions in organisations. They described two main perspectives on rule violations by employees: either the rules were inappropriate or the individuals were misguided. In the first case, employees should be commended for deviating from H&S rules. In the second case, they should be instructed or even punished. The authors suggested that H&S management would be improved if top-down rule-setting were supplemented with bottom-up rule development, requiring comprehensive communication between managers and employees. In this way, H&S measures would fit actual situations on the work floor, and staff would be persuaded to comply. Therefore, training – of both employees and managers – should not only cover information on formal H&S rules but also address operational behaviours and cultural principles. According to Hale and Borys (2013a, 2013b), all elements of a good safety climate would be considered by modifying the typical H&S management process of continuous improvement. This corresponds to the focusing approach in ongoing operations as it was observed at one Dutch fire department (section 7.2).

In the project context, the focusing approach to H&S management was observed at fire departments in all three countries. Interviewees mentioned 'moral and personal' motivations more often with respect to focusing than with respect to other approaches to

H&S management. They were Law & People Managers when they adopted a focusing approach (section 8.3). Such managers follow the advice of Hale and Borys (2013b, p. 223) that *"social interaction"* and *"tacit knowledge"* of the people on the work floor should be taken into account when H&S laws are translated into an operational HSMS. The focusing approach always comprises the HSMS elements of 'leading', 'taking care' and 'innovating' that characterise the envisaged innovation processes of modern proactive H&S management (section 2.4). The focusing approach is mostly applied in project contexts and may be compared with general innovation management. In accordance with the observations of this study, Kanter (2016, p. 3) described that innovations were typically implemented through change projects:

> *"Innovation begins with someone being aware enough to sense a new need."*

Top managers initiate projects because they personally perceive a need for change, or because somebody tells them about such a need. Thus, innovation processes tend to begin with significant incidents. The commander of S-2, for instance, explained that his focusing project on new ways of working at motorway sites was not an outcome of the fire department's HSMS but was developed together with other organisations after several deadly accidents in the country. Obviously, the formal risk assessment of an HSMS can create the perception that H&S measures are urgently needed. However, understood in this way, such risk assessments are not the fundamental basis for continuous improvement, but represent only one of many possible starting points of H&S change projects. To implement these changes, focused management is needed, as was described by the commander of S-5 in section 7.1; this is confirmed by Kanter (2016, p. 10):

> *"Leaders must stay closely involved with the implementation process and keep the focus on the innovation, or things can move so slowly that new initiatives atrophy."*

In contrast to such project-based approaches, EU-OSHA (2012) recommended a process of continuous H&S improvement as the best organisational HSMS. The country cases in this study (section 7.3) confirmed that national H&S authorities promoted this

management principle, which is reflected in the EU Framework Directive 89/391/EEC on Safety and Health at Work (Ales, 2013). In Sweden, inspectors enforced corresponding management systems; in the Netherlands, they negotiated such approaches; and in Germany, they informed organisations about them. Nevertheless, project-based focusing was observed in all countries and was applied regardless of legal stipulations. This approach was associated with Law & People Managers, who were driven not only by the 'power of formal rules' but also by 'moral and personal' motivations. It can therefore be concluded that, when implementing improved H&S conditions, managers with strong 'moral and personal' motivations are more likely to deviate from H&S laws. Their approach to H&S management corresponds to the principles of change projects rather than to the principles of continuous improvement.

Formalistic ways of implementing an HSMS according to the EU Framework Directive were most common at Swedish fire departments. These organisations aimed at pursuing a co-determination approach to continuously improve H&S conditions. However, the identified ways of implementing an HSMS there did not work well, as they were lacking the element of 'leading'. Swedish researchers such as Frick (2013) and Sanne (2018) emphasised that 'leading' was important for successful implementation of an HSMS. Sanne (2018) described that employees of fire departments expected top management to show interest in H&S issues. According to him, employees had informal talks about critical incidents, but these were often not reported to top management, either informally or formally. Frick (2013a) emphasised the importance of leadership when he presented his case study on an HSMS implementation in a Swedish municipality. Thus, research from Sweden confirms this study's assumption that 'leading' is necessary for successful implementation of an HSMS. As concluded in Chapter 7, focusing covers 'leading' and also ensures the development of organisational H&S rules. However, Swedish authors still emphasised the importance of systematic and formal systems based on co-determination (Frick and Johanson, 2013; Sanne, 2018), disregarding project-based alternatives with simplified H&S rules. Nevertheless, focusing is even applied at Swedish fire departments to solve the leadership problem.

According to the data of this study, the German and Dutch approaches to H&S management were more pragmatic than those of Swedish organisations. Dutch fire departments had fewer H&S rules than Swedish ones, and German fire departments had practically no locally developed H&S procedures. The lack of H&S rules made

'innovating' less possible because such rules were needed as a reference for behaviour and a starting point of discussion. Therefore, German researcher Beck (2011) thought that only organisations that accepted the formalistic documentation tools of H&S authorities were pursuing an acceptable HSMS. Hale (2015), a long-time professor at the Delft University of Technology, the Netherlands, emphasised that written rules were the pre-requisite for continuous H&S improvement. Thus, German and Dutch researchers seem to be concerned about a lack of H&S rules in their national organisations. This corresponds well with the observed importance of domination in Germany and co-operation in the Netherlands. The former implements (technical) guidelines without considering employees' views. The latter is based on informal employee discussions without written rules. Only in focusing is management leadership supplemented with the bottom-up development of formal H&S rules. While the element of 'leading' is absent in Sweden, the element of 'innovating' is lacking in Germany and the Netherlands. However, there typically is a formal systematic HSMS at Swedish fire departments, while German and Dutch top managers tend to neglect such legal provisions.

Schmitt-Howe (2018a) asked why managers deviated from the legally prescribed processes of continuous operational H&S improvement. In her study, she conducted qualitative interviews with top managers and H&S experts at 50 German companies from several industries. Similar to this study, she was interested in managerial approaches to H&S. However, in contrast to this study, her interview questions investigated general *"types of action"* and *"mind-sets"* (Schmitt-Howe, 2018a, p. 173) rather than specific practices and associated motivations. With respect to Casey *et al.* (2017), her investigation might be considered an analysis of safety culture, while this study focused on the elements of safety climate. The outcomes of her study reflected three of the four approaches to H&S management that were developed in section 7.2:

- Co-determination: Such formalistic approaches to H&S management were observed at large enterprises in Germany, either as a manifestation of an independent H&S culture, corresponding to strong social norms, or as a strict controlling approach, reflecting a strong focus on organisational rules. Schmitt-Howe (2018a) found that big companies tended to use a formal HSMS more often than small ones, which was consistent with previous studies (for example Nordlöf, 2015).

- Co-operation: Companies of all sizes displayed the attitude of *"humans are central"* (Schmitt-Howe, 2018a, p. 175), which was reflected in the creation of *"relevant behavioural standards by an ongoing process of discussion with employees"*. Formal H&S rules tended to be applied less often. Organisational safety cultures were characterised by a reliance on either employee initiative or managers' duty to care.

- Domination: This approach was adopted by the largest number of companies in her sample. Organisations of all sizes and in all sectors acted accordingly. Managers concentrated on engineering solutions for H&S problems, reflecting a strong belief in safety equipment and in the technical guidelines of H&S authorities. They focused on budget and purchasing decisions, as they mainly aimed at ensuring that appropriate equipment was available.

Schmitt-Howe (2018a, p. 176) additionally described *"self-reference"* organisations, which did not deal with H&S management but relied on the aptitude of their employees. Overall, it is concluded that the findings of Schmitt-Howe (2018a) correspond well with the findings of this study. However, due to its more operational view, this study identified the focusing approach to H&S management as an additional managerial option.

In summary, the outcomes of this study indicate that managers' ways of implementing an HSMS can be described and categorised with the help of the four safety climate elements depicted in Figure 9.2. Managers adopt four different approaches to H&S management: co-determination, co-operation, domination and focusing. The first three categories correspond to Schmitt-Howe (2018a), while the latter comprises change management projects that managers use to improve specific H&S conditions. Only Law & People Managers use focusing projects, because this approach typically violates the rules of H&S authorities, compromising the legal motivations of Law Managers. In Germany and Sweden, it seems to be most common to act as a Law Manager and to try to follow formal H&S rules by either implementing systematic processes (corresponding to co-determination, found particularly in Sweden) or providing appropriate technical equipment (corresponding to domination, found particularly in Germany). In the Netherlands it is accepted that H&S rules are negotiated between authorities, managers and employee representatives. Accordingly, there is a larger

variety of management approaches there. Law & People Managers, who apply focusing, seem to be most frequently found in the Netherlands. Nevertheless, managers in Germany and Sweden also use focusing to solve the problems of the more common ways of implementing an HSMS, which are characterised by a lack of the elements 'innovating' or 'leading'.

9.3 Managers' H&S motivations and regulation by H&S authorities

With respect to H&S laws, it emerged from the literature review that most managers engage in H&S consultation processes with employees and H&S authorities if they become aware of non-compliance (Fairman and Yapp, 2005a) and if they perceive authorities to be willing to advise (Beck, 2011). Such consultations with employees and authorities take different forms depending on the motivational settings of top management as identified in Chapter 8. Law Managers focus on the information and directives of H&S authorities, adjusting organisational procedures and practices according to regulatory feedback. Law & People Managers, on the other hand, additionally consider the views of their employees when adapting H&S measures to local conditions. This perspective from the work floor does not necessarily result in legal compliance, but it aims at creating optimal H&S conditions based on the idea of enforced self-regulation (EU-OSHA, 2012). Thus, Law & People Managers may have to choose between legal requirements and optimal H&S conditions. This choice may require individual judgements regarding the legality and legitimacy of H&S measures, and it may lead to conflict with H&S authorities. Law Managers, in contrast, will only have conflicts with H&S inspectors if their measures do not fully reflect H&S directives or recommendations.

The developed typology of managers' H&S motivations suggests that H&S regulators may adopt two distinct approaches to promoting good H&S conditions in organisations. The principles of the enforcement pyramid (Figure 2.8) seem to be most appropriate for Law Managers. Their motivations are mainly related to the activities of inspectors. When deciding about compliance, they probably consider both economic and reputational consequences of non-compliance, as was suggested by Braithwaite (2011). Law & People Manager additionally feel a moral responsibility to their employees because they are aware that their decisions affect the safety conditions at workplaces

and determine the likelihood of harm to employees (section 2.6). This kind of H&S motivation, which was labelled 'moral and personal' in Chapter 8, is not covered by the principles of the enforcement pyramid. Therefore, it ought to be addressed by additional regulatory activities, and it requires an appropriate regulatory attitude. Hale and Borys (2013b, p. 230) emphasised that *"the more rule sets come under the scrutiny… the less likely is it that organisations can preserve the flexibility of their own sets of rules"*. Thus, effective H&S management implies that at least some legally defined H&S rules are ignored. The dialogue with employees and the consideration of their operational practices on the work floor are more relevant than the demands of inspectors. Such reasoning reflects the individual moral judgement of Law & People Managers.

Ernste and Wildner (2015) described moral judgements as a key element of business ethics. Their analysis referred to German-American philosopher Hannah Arendt, who was one of the leading analysts of the relationships between *"intention, motivation, moral agency, and responsibility"* in the 20th century (Jeffery, 2008, p. 101). They stated that managers had to take the time to reflect on decisions, because resulting actions should be both legal and legitimate. They assumed that this managerial responsibility was necessary because laws and regulations could not cover all circumstances. Those moral judgements were based on managers' socialisation, which in turn was affected by critical discussions with others (Bradshaw, 2013; Nielsen, 1984). With respect to environmental management systems, which are structurally similar to H&S management systems, Bradshaw (2013, p. 220) concluded that the dedicated organisational procedures for involving both management and employees created moral awareness by *"providing room for the expression of environmental concerns within company decision making"*. Therefore, the author recommended that formal management systems should be mandatory in order to promote discussions on ethical issues within organisations.

An empirical study on tax compliance in the United Kingdom (Hallsworth, 2017) found that, next to legal deterrence, social norms, that is, the perceived behaviour of others, had the strongest positive effect on compliance. Ethical concerns, which reflect individual moral standards, seemed to be less relevant for individuals' decisions in this area. In contrast to this finding, the analysis of Chapter 8 indicates that individual 'moral and personal' motivations are always more important than the 'power of

informal rules' that stems from peer pressure and social reputation. Social norms are probably less relevant for managers than for the general population because they typically decide rather independently. Additionally, 'moral and personal' motivations can be assumed to be more common in H&S management (or environmental management) than in tax compliance because the ethical relevance of managerial decisions is higher due to the potential for human or environmental harm. Thus, in contrast to Hallsworth (2017) but in line with Bradshaw (2013), it is concluded that ethical concerns are relevant in H&S management and regulation.

The circumstances under which managers make good moral judgements on H&S issues were previously investigated by Nielsen (1984). Like Bradshaw (2013) and Ernste and Wildner (2015), he cited Hannah Arendt. In his view, managers' thinking about their responsibilities *"should be an individual and independent, habitual activity"* (Nielsen, 1984, p. 158). He argued that this activity should be based on critical discussions with peers. He mentioned the operation of low-cost factories with bad H&S conditions as an example of managers' moral responsibility. Especially under severe pressure, for example from superiors or economic constraints, managers should be expected to take the moral legitimacy of their actions into account and should adapt their decisions accordingly. Nielsen (1984, pp. 155-157) described three types of managers that did not meet this ethical requirement: the *"Richard III"* type decided to give way to the pressure. He knew that his actions were bad and immoral, but he did it anyway for personal benefit. The second type, *"Faust"*, acted with full moral consciousness and did bad things for the greater good rather than for personal benefit. Finally, the *"Eichmann"* type made no moral judgement because he was *"thoughtless"* (according to Hannah Arendt). He did not see the moral and ethical problems of his actions. Both Bradshaw (2013) and Nielsen (1984) suggested that critical discussions and related reflections could create moral awareness. Thus, it can be expected that managers will not act like *"Eichmann"* (or perhaps *"Faust"*) if their moral judgement is promoted.

Heyler *et al.* (2016) presented a practical model of ethical decision-making and moral judgement. Their qualitative data comprised 205 statements on decision-making processes from 25 interviews with senior managers of the United States Air Force and Department of Defence who were colonels and lieutenant colonels or equivalent high ranking civilian employees. Similar to this study, they developed an explanatory model by combining literature with empirical data. They found that moral awareness, which

reflected the manager's personality and experience, and perceived ethical relevance, which reflected human proximity and the manager's knowledge of potential consequences, formed the basis of thoughtful moral judgement. The outcome of the individual decision-making process was then determined by the manager's *"moral potency"* (Heyler *et al.*, 2016, p. 797), which comprised feelings of moral ownership, courage and confidence. If the manager felt the ownership and courage to decide and act, there could be a positive ethical outcome that would increase confidence and, with it, improve the manager's future ethical decision-making. The interviews with senior managers provided the basis for a circular model according to which experience of ethical issues promotes better managerial practices. Heyler *et al.* (2016) emphasised that moral awareness was not enough: it had to be complemented with ownership. This sense of moral responsibility would, in their view, motivate managers to take corrective action. They suggested that *"moral potency"* could be stimulated by means of case studies, group discussions and mentoring sessions. Thus, their empirical analysis confirmed Bradshaw (2013) and Nielsen (1984), who theoretically derived that personal discussions are necessary in order to sensitise managers to the moral aspects of H&S management. This idea corresponds well with the data of this study, as the open and result-oriented discussions between fire departments and inspectors in the Netherlands resulted in more statements reflecting 'moral and personal' motivations, that is, more Law & People Managers.

Based on the typology of managers' H&S motivations and the related approaches to H&S management (section 9.1), it is concluded that inspectors should address both legal and moral motivations when engaging with top managers. Legal considerations form the basis of the general approach of responsive regulation in today's legal environment of enforced self-regulation (sections 2.5). Inspectors should help managers to comply and emphasise their legal responsibility by signalling potential sanctions (Braithwaite, 2011). However, the results of this study indicate that managers whose statements show that they are mainly motivated by the 'power of formal rules' apply HSMSs with limited effectiveness, that is, co-determination and domination. In contrast to these Law Managers, additional 'moral and personal' motivations typify Law & People Managers. They pursue the approaches of focusing and co-operation, joining forces with their employees to develop better H&S conditions. As demonstrated in the Netherlands, open and result-oriented discussions between inspectors and managers promoted 'moral and personal' motivations and ethical decision-making. Such conversations sensitise

top managers to the moral aspects of H&S. In contrast to the Dutch H&S authority, German H&S inspectors were rarely available for conversations, and Swedish inspectors were strict on rules due to their policing approach (section 7.3). Thus, it can also be concluded that the frequency and duration of H&S inspections, which have been reduced in the EU in recent decades (Frick and Johansson, 2013; Tombs and Whyte, 2010; Satzer, 2011), should be increased so that inspectors more opportunities to take the time for open and result-oriented discussions with top managers, promoting Law & People Managers.

Regarding the frequency of inspections, the data of this study indicated that the 'power of formal rules' was an important motivation both with and without regular inspections. Despite the low frequency of inspections in Germany, managers there still seemed to perceive the deterrent effect of potential sanctions in the same way as managers in Sweden, where fire departments were regularly visited. This finding contradicts Braithwaite (2011), who emphasised that the enforcement pyramid would not work with a weak regulator that could not put pressure on regulated organisations. Hallsworth (2017, p. 174) additionally found in his behavioural investigations that managers may strategically omit legal duties if there is insufficient regulation.

> *"In sum, there is evidence that individuals engaged in dishonesty use omission options strategically. Omission options create greater ambiguity about the intentions of the individual, and they offer more scope for the behaviour to be rationalised and re-categorised. These qualities are likely to reduce the blame that is allocated, the punishment administered, and the psychic costs incurred."*

According to the analysis of Hallsworth (2017), social pressure (*"blame that is allocated"*), legal forces (*"punishment administered"*) and moral feelings (*"psychic costs"*) can initiate such omission behaviour. In terms of social norms and legal frameworks, negligence is less blameworthy than deliberate actions. At the same time, breaches of individual moral standards may be retrospectively justified by reframing one's own decisions. Hallsworth (2017, p. 176) found that tax compliance was better when tax authorities amended their written request with the statement "*this will be an*

active choice", just as if they were discussing the issue with the individuals. Based on Braithwaite (2011) and Hallsworth (2017), it is therefore concluded that regular inspections are necessary for the purpose of both putting pressure on managers and ensuring that omission behaviour is prevented. A sufficiently high frequency of inspections is necessary to promote positive engagement in H&S management, in terms of both Law Managers and Law & People Managers.

Looking at the country cases in section 7.3, it is concluded that the German H&S authorities are unlikely to encourage managers to create good H&S conditions. They neither visit organisations regularly nor do they discuss H&S issues openly. Instead, they focus on publishing general technical guidelines. The Swedish H&S authority, in contrast, applies the enforcement pyramid by providing specific guidelines and ensuring that local rules are implemented. Finally, the Dutch regulatory agency additionally promotes moral judgement by regularly discussing inspection results with managers. This approach might have been limited to fire departments in the Netherlands because inspectors have been focusing on these organisations due to the many regional mergers in recent years. However, the resulting activities of the Dutch H&S authority have created a good example of what can be achieved. Law & People Managers were most commonly found in the Netherlands, yielding many focusing projects.

In summary, this study indicates that there are two ways of promoting managerial self-regulation. The objective is to motivate top management to ensure good H&S conditions in workplaces:

1. A functioning enforcement pyramid (Figure 2.8) can be achieved through consistent support and deterrence, which enable compliance and discourage managers from using strategies of omission. This practice of advising and threatening promotes Law Managers.

2. Good moral judgement can be promoted through open and result-oriented discussions, which ensure that managers understand rules and recognise their individual moral responsibility. Advising and sensitising in this way promotes Law & People Managers.

Both ways require frequent inspections, though with different regulatory attitudes. The first approach corresponds to the known concept of responsive regulation as described by Braithwaite (2011). Inspectors support organisations in implementing H&S measures that typically are (largely) defined by the H&S authority. If managers do not comply or try to omit decisions on H&S rules, potential sanctions are signalled. The second approach supplements the enforcement pyramid of Braithwaite (2011) by promoting good moral judgement. Openly discussing H&S issues with managers promotes 'moral and personal' motivations. Assuming that managers generally aim to prevent harm to their employees, inspectors allow deviations from H&S rules in order to facilitate individual organisational H&S measures (Hale and Borys, 2013b). With it, the effective management approach of focusing will be promoted, which this study exemplified at fire departments in three countries. Inspectors can create optimal H&S conditions in organisations by taking the time to discuss matters with top managers and allowing them the freedom to conduct their individual change projects.

Chapter 10
Contributions to Knowledge

10.1 New method for analysing ways of implementing an HSMS

This study proposes a new method for identifying and categorising managers' ways of implementing an HSMS. The new HSMS model derived from the safety climate literature was successfully applied during data collection and analysis. Four critical elements of effective H&S management are identified: 'deciding', 'innovating', 'leading', 'taking care'. The interviews with the commanders and H&S experts of fire departments showed that these elements are suitable for describing ways of implementing an HSMS in working environments with relevant operational H&S risks. The sub-categories depicted in Figure 9.2 give concrete form to the four critical elements that can be used to guide semi-structured interviews with organisational members. Applying safety climate as a framework for evaluating managerial practices has recently also been proposed by others (for example Casey *et al.*, 2017). Contrary to the safety climate literature, where quantitative surveys are typical, this study presents a qualitative methodology. This is considered more suitable for describing organisational realities, offering a promising approach for practical applications in H&S management.

The tested HSMS model (Figure 9.2) represents a significant contribution to the scientific discourse because it provides a new view on HSMS implementation in organisations. These are typically examined qualitatively in studies on safety culture and reviews of operational practices, or they are analysed quantitatively with surveys on safety climate (section 2.1). Presenting an HSMS model that is derived from the quantitative literature on safety climate but that is still qualitative in nature, this study provides a new tool for describing the H&S reality in organisations. In contrast to earlier research, safety climate, which reflects the H&S perceptions of employees, is analysed with semi-structured interviews instead of being investigated with forced-choice questionnaire surveys. This puts the focus on the interaction between managers and employees, adding a management perspective to the prevailing inspectors' view on formal compliance.

The new method for evaluating ways of implementing an HSMS represents an integrative approach in a diverse scientific and practical discourse. The different

literature streams on safety culture, safety climate and practical guidelines have been integrated in order to improve the understanding of managerial H&S decisions (Chapter 2). As depicted in Figure 2.1, top management shapes an organisation's HSMS in the context of its safety culture and its physical H&S environment. The safety culture has been developed over time by the activities of management and the organisational history. The physical H&S environment depends on the operational work and equipment, which are affected by practical guidelines, including rules laid down by H&S authorities. The resulting HSMS is then perceived by employees, who adjust their behaviour accordingly, as suggested in the safety climate literature. By integrating the main scientific and practical perspectives, this study's new HSMS model contributes a significant point of reference in the diverse field of H&S management.

10.2 Change projects as an alternative approach to H&S management

The data from this study provide empirical evidence that change projects are used to directly improve H&S conditions on the work floor. This approach to H&S management, which is termed 'focusing' in Chapter 7, is related to the literature on innovation management. It is adopted in all three countries despite their different regulatory environments. Focusing is considered effective in terms of safety climate and thus actual H&S conditions (Figure 2.1). According to the author's knowledge, change projects have not been regarded as autonomous approaches in previous studies on H&S management. Instead, such interventions were only considered as a means for improving organisational H&S procedures and cultures (Beck, 2011; Frick, 2013a; Hale *et al.*, 2010). Schmitt-Howe (2018a) did not identify change projects when developing her typology of H&S management approaches. Therefore, the identification of focusing as an additional, mostly project-based approach to H&S management marks a significant contribution to the scientific knowledge base.

The identified ways of implementing an HSMS are good examples for day-to-day H&S management in medium-sized organisations. As described in section 6.3.2, there are two kinds of employee involvement that reflect effective focusing projects. Minor changes to H&S conditions are discussed and decided on by employees in dedicated workshops set up by management. Examples are small-scale equipment innovations and operational risk assessments. Major H&S measures are developed by top managers

together with their employees, including not only formal representatives but all relevant stakeholders. Examples of measures for promoting such broad communication include a goodie box or team shirt for project participants, a symbolic safety tool or an H&S theatre play. In all incidents, managers act as leaders that encourage employees to take care and innovate.

The literature on safety culture suggests that focused change projects improve H&S conditions not only directly, but also indirectly via positive effects on the safety culture (section 2.2). The H&S projects become part of the organisational history, and employees will remember that top management supported such H&S initiatives. According to Reason (2016), the visible involvement of management in safety processes is a particularly important benefit of a formal HSMS. By providing similar management involvement, focused change projects may take the place of such systems. As stated in section 2.6, only relatively large enterprises tend to have formal procedure for continual H&S improvements. Thus, especially for small to medium-sized organisations, the identified alternative approach to H&S management represents a significant contribution that may improve both managerial and regulatory practices. The findings should even be considered by large enterprises because focusing may also be applied in medium-sized divisions or subsidiaries (section 10.3).

10.3 Typology of managers' H&S motivations as a new regulatory perspective

The findings of this study indicate that a regulatory approach that considers the moral issues of H&S management improves the effectiveness of authorities' measures in terms of actual H&S conditions on the work floor. The empirical data led to a typology of managers' H&S motivations that reveals two characteristic types of positive H&S engagement (Figure 9.1). Decision makers become either Law Managers or Law & People Managers, depending on the circumstances. In the former case, the enforcement pyramid of Braithwaite (2011) may be applied in order to motivate by the 'power of formal rules'. In the latter case, however, this known regulatory model falls short because it does not address 'moral and personal' issues. The typology developed in this study emphasises the importance of such moral motivations and suggests that H&S regulations and corporate training should promote ethical decisions by means of open and result-oriented discussions with top managers. This is expected to result in

improved organisational approaches to H&S management, especially focused change projects (section 10.2). Thus, the typology makes a significant contribution to regulatory theory because it indicates how the established enforcement pyramid should be amended in fields where moral aspects are relevant.

The practical value of the typology of managers' H&S motivations stems from its potential to improve regulators' understanding of managers' behaviour. Instead of exclusively referring to the enforcement pyramid of Braithwaite (2011), inspectors ought to consider 'moral or personal' motivations, too. If their focus remains on ensuring compliance with H&S laws and rules, they will keep applying the principles of the enforcement pyramid. If they allow discretion for managers to adjust H&S rules to local needs, they will conduct open und result-oriented discussions on optimal H&S measures. In the latter case, they will become aware that managers often prefer focusing projects to systematic improvement processes. Under the plausible assumption that sensitising managers to ethical issues is more complex and time consuming than threatening legal sanctions, this study's regulatory conclusion implies that more H&S inspectors are needed if Law & People Managers are to be promoted. This finding may provide H&S authorities with good arguments for increasing staffing levels.

The developed typology also has practical implications for the definition of H&S laws and rules. By providing evidence that the current H&S regulations in the European Union do not necessarily yield optimal outcomes in the field of H&S management, this study may prompt discussions regarding the underlying legal framework. Both the H&S laws and the latest H&S standard ISO 45001 refer to management systems for continual H&S improvement. Such procedures conflict with the approaches of Law & People Managers, who prefer project-based H&S measures (Figure 9.1). The interview data suggest that H&S change projects are popular in all countries, though managers are aware that their approaches do not necessarily satisfy legal requirements. It is recommended that H&S authorities and policy makers allow managers sufficient freedom to deviate from the rigid processes described in todays' H&S laws and standards. If top managers are also sensitised to the moral dimensions of their H&S decisions, they are more likely to implement effective HSMSs that ensure good H&S conditions for employees. By revealing such managerial motivations and practices in medium-sized organisations, this study makes a significant contribution to practical discussions on potential innovations in H&S laws, regulations and industry standards.

Large enterprises may apply this study's new regulatory perspective to their divisions or subsidiaries. Such organisations are subject to not only authorities' H&S regulations but also corporate H&S rules. They tend to implement more formal HSMSs than independent medium-sized organisations because large enterprises often use formalistic management approaches to implement a distinct H&S culture or a strict controlling approach across the whole group (Nordlöf, 2015; Schmitt-Howe, 2018a). However, according to the findings of this study, top managers of subsidiaries should also be allowed to apply focusing in order to create optimal H&S conditions. The typology according to Figure 9.1 applies if these subordinate top managers are senior decision makers who are used to deciding independently (Heyler *et al.*, 2016). Just like H&S authorities, the top organisational level of large enterprises should amend the enforcement of formal H&S rules with sensitising top managers of divisions and subsidiaries. Such an approach might have improved the problematic H&S conditions at British Railways described in section 1.1. This study's findings suggest that the often complex H&S rules of large enterprises should be simplified and that senior managers' training should consider the ethical and moral dimensions of H&S issues.

Overall, the typology of managers' H&S motivations (Figure 9.1) provides a significant contribution to the scientific and practical discourse because it reveals the role of 'moral and personal' motivations in the field of H&S. Effective change projects for improved H&S conditions (reflecting the focusing approach) are conducted by managers who feel a moral responsibility toward their employees. The 'power of formal rules', in contrast, promotes formalistic approaches that are less functional, particularly in medium-sized organisations. Therefore, it is recommended that H&S regulations and corporate training use open and result-oriented discussions – regarding specific practices or general case studies – in order to sensitise managers to the moral dimensions of H&S issues.

10.4 Summary of this study's findings

This study has resulted in three main knowledge contributions. First, the new HSMS model integrates the different strands of the diverse H&S literature and provides a promising tool for practice, putting the focus on the interaction between top managers and employees. Second, change projects were identified as an alternative management

approach that is applied in all three countries despite not fulfilling legal requirements. Third, the typology of managers' H&S motivations suggests that H&S decisions are significantly affected by managers' feelings of moral responsibility. Having identified this motivation and its direct relationship with effective change projects in the field of H&S, it is concluded that regulatory rules and practices should be adjusted. Scientist and practitioners alike should take into account that ethical decision making by top managers is an important aspect in promoting good H&S conditions for employees. This new understanding of managerial decision making will improve working conditions particularly in small and medium-sized organisations where today's complex H&S rules and ISO standards typically are poorly implemented.

Chapter 11
Limitations and Future Research

11.1 Limitations and generalisability of the findings

As stated in section 2.1, the methodological focus of this study was to develop an explanation that would not be limited to the context of the investigated cases but would be generalisable to other industries. Following Eisenhardt (1989), the degree of generalisability was evaluated by comparing the researcher's findings with the literature. For example, it was concluded in section 9.2 that the high frequency of statements relating to the 'power of formal rules' in Germany was not plausible because it contradicted Braithwaite (2011) and Hallsworth (2017). Instead, it was assumed to be a result of the sampling process, which was biased towards fire department managers with positive views on H&S (section 4.5). Based on such theoretical considerations, it is concluded that the typology of managers' H&S motivations (Figure 9.1) applies to all medium-sized organisations that encounter substantial operational H&S risks, raising moral questions for top management. The HSMS model (Figure 9.2) and the management approach of focused change projects could then be used in organisations where there are relevant differences between the written H&S rules and the reality of their work (section 9.1). However, it cannot be derived from the known literature which specific businesses, with the exception of high-risk industries such as aviation, chemicals and firefighting, are substantially affected by such operational characteristics. Also, the data from this study do not permit any predictions as to the organisations to which managers could apply focusing to cover all the elements of an effective HSMS according to the study model.

The reliability and validity of the data differed between the fixed- and open-coding procedures of this study. Managers' ways of implementing an HSMS were identified using the fixed-coding scheme of the deductively derived HSMS model (Figure 2.7). Following the conclusions from the pilot studies, the elements of the model were discussed with all interview participants in order to ensure reliability and validity through *"member checking"* (Saldaña, 2009, p. 28). The open-coding procedures, in contrast, were less exact, especially in terms of managers' H&S motivations. This coding and categorisation of the interview data were not checked by anyone other than the author. Regarding the statistical analysis of the counted motivation statements in

Chapter 8, there is the additional issue of correctly separating codes, that is, distinguishing between repeated and distinct statements. However, an effort was made to increase reliability and validity by repeatedly reviewing the interview transcripts in different contexts during the relatively long data analysis period, which lasted about ten months. Following Eisenhardt (1989), there was no pre-defined initial concept. The coding categories and the typology were developed over time, as the author frequently tested his findings on participants' answers. Overall, it should be acknowledged that the typology of managers' H&S motivations (Figure 9.1) may not reflect all relevant motivations.

As is typical for research based on cross-sectional case-studies, the sample size was rather small in comparison to questionnaire surveys (Yin, 2014). The four fire departments in each country were not representative but were biased towards managers with a special interest in H&S issues. It was expected that participants had a positive view on H&S and that they were willing to describe their ways of implementing an HSMS because they considered their H&S activities to be at least appropriate (section 4.5). Accordingly, there were no interviewees who could have provided information on motivations for not engaging in H&S management. However, the sampling was suitable for describing the relationships between regulatory perceptions, motivations and H&S management practices. By limiting case selection to the business of firefighting, the effect of differences in industry cultures was smaller than in cross-industry studies. National characteristics were elaborated in the country cases by comparing the data with the literature. Nevertheless, it is unknown whether national cultures have unidentified effects with respect to both positive and negative views on H&S.

The literature on safety climate formed the theoretical basis of the HSMS model (Figure 2.7) that was used for data collection and analysis. Although safety climate investigations would typically be done with employee surveys on the organisational H&S conditions, this study collected data by interviewing representatives of top management. The ways of implementing an HSMS were investigated with reference to managers' descriptions of their activities and their perceptions of employees' responses. In doing so, the plausible assumption was made that managers acted in a way that was well understood by employees. Still, it might have been beneficial to quantitatively measure the actual safety climate in the participating organisations. This was not

possible in the cross-sectional setup because employee surveys would have required agreements with the works councils in all organisations. Additionally, it was assumed during research design that H&S issues might be used by employees and their representatives as tools in organisational politics. Staff could put pressure on top management by claiming that certain measures were necessary because of H&S reasons. The interviews at NL-3 and S-5 confirmed this initial assumption (see sections 6.3.2 and 6.3.3). Thus, if employees had been asked about H&S management practices at their organisations, the interviewees of this study might have encountered corresponding conflicts with their staff. This would have probably affected the answers of both management representatives and employees. Therefore, the study's findings on ways of implementing an HSMS were not triangulated by asking employees but are exclusively based on the views of top managers.

11.2 Areas for future research

To address the limitations of this study, the new HSMS model (Figure 9.2) and the typology of managers' H&S motivations (Figure 9.1) could be tested in further qualitative and quantitative studies. Following the exploratory approach of this study, both concepts aimed at providing new perspectives on H&S management and H&S regulation. Future research could challenge the underlying views.

If future studies were to apply the new HSMS model (Figure 9.2) in other industries and countries, its generalisability could be checked, and necessary amendments could be identified. Additional qualitative cases would increase the data base of this study. According to this study, it is possible to discuss the elements of safety climate with representatives of top management. Such additional data would help to better understand in what kinds of organisations focused change projects help top management to create better H&S conditions. Such knowledge would then also inform the regulatory activities of H&S authorities.

Testing the typology of managers' H&S motivations in other industries and countries could investigate whether Figure 9.1 covers all relevant motivations. Further qualitative studies could scrutinise the effects of nationalities and industry cultures and potentially identify necessary amendments. Discussing the typology with inspectors of H&S

authorities could additionally improve its reliability and applicability. As outlined by Hawkins (2002), the regulatory strategies of H&S authorities are based on inspectors' perceptions of managers' motivations. Those strategies, in turn, affect managers' motivations and ways of implementing an HSMS. The most appropriate typology of managers' H&S motivations might well be approved by both managers and inspectors.

If this study's new perspectives on H&S management and H&S regulation were to be used for quantitative research across industries and countries, the data base on the identified relationships with managers' motivations could be improved. Even negatively engaged managers might respond to anonymous H&S questionnaires (Nordlöf, 2015). Unlike in previous surveys (for example EU-OSHA, 2010; EU-OSHA, 2015), questions on managerial practices should distinguish between legally prescribed processes and change projects. By relating the different ways of implementing an HSMS to managers' H&S motivations and regulators' approaches, the typology of managers' H&S motivations (Figure 9.1) could be challenged with a larger data base.

Longitudinal case studies may improve the understanding of the relationships described within the typology of managers' H&S motivations. By investigating the managerial and regulatory situations in specific organisations and asking top managers about their motivations, examples could be developed that either support or contradict the conclusions of this study. Due to the more intensive communication and information exchange in longitudinal case studies, the reliability and validity of constructs would presumably be better than in the cross-sectional research of this study. Additionally, if employees' perceptions were to be considered and actual H&S conditions evaluated, the effectiveness of the focused change projects could be scrutinised. Such research could also demonstrate the interplay between legally prescribed ways of implementing an HSMS and additionally applied focused change projects.

11.3 Summary of limitations and future research

The limitations of this study and the recommended areas of future research mainly result from the cross-sectional methodology and the finite resources of the research project. The reliability and validity of data collection and analysis was less exact than it

might have been in a longitudinal case study. The sample was limited to 12 organisations in one industry in three European Union countries. Also, it was not possible to ask the fire department employees about their perceptions of organisational H&S conditions because this would have required agreements with the individual works councils and it could have resulted in political conflicts within the organisations. Accordingly, it is recommended that additional qualitative case studies – both cross-sectional and longitudinal – and quantitative surveys be used to enlarge the data base. If future research were to be conducted based on this study's ideas of focused change projects and moral decision-making, it could challenge the associated relationships within the typology of managers' H&S motivations.

Chapter 12
Personal Reflections

Having considered H&S issues from the perspectives of both managerial practice and scientific research, I am astonished how little fact-based evidence exists in this field. I would still repeat the following question that Andrew Hale, a long-time professor of safety science at Delft University of Technology, the Netherlands, raised in his valedictory lecture in September 2006 (Hale, 2006):

> *"Why is it that we are so prepared in the practice of safety to accept and implement sometimes very costly preventive measures, including whole safety management systems, without any good scientific basis as to whether they work or not?"*

Hale (2006) explained that the positive effects of organisational H&S measures might be considered obvious, or that companies had conducted but not published validation studies. In my view, it should be added that generations of safety experts have been educated according to the ideas of formal management systems for continuous improvement, which have been spreading since the 1970s (Reason, 2016) and have been required by H&S authorities across Europe (EU-OSHA, 2012a). Therefore, many actors in the field of H&S management seem to take it for granted that systematic rule-based approaches are effective. As a manager of a small organisation, without an education in the field of H&S management, I did not know how to implement such HSMSs. I probably had a rather superficial view when I started my research project in 2014. Indeed, the vice-commander of D-1, whom I interviewed for the second pilot study, had a master's degree in safety engineering and explained to me how risk assessments are supposed to be done in Germany. He focused much more on technical solutions than on behavioural changes, in contrast to the Dutch H&S experts whom I interviewed for the first pilot study at NL-1. Thus, there seemed to be national traditions of H&S teaching, which I investigated as an experienced manager.

The literature review in the fields of H&S management and H&S regulation proved to be difficult. There were many concepts that were similar in character but were described and applied in very different ways. Guldenmund (2010) emphasised the

fuzziness of the safety culture concept, including safety climate. Similarly, the regulatory terms *"risk-management process regulation", "enforced self-regulation"* and *"management-level regulation"* all referred to the same idea of corporate H&S improvements under responsive regulation (Hale *et al.*, 2015, p. 118). Although these two fields of literature were not the focus of the research, they formed an important basis for addressing the identified literature gap. In order to answer the question of how top managers' ways of implementing an HSMS were affected by their H&S motivations, it was necessary to understand the literature on the envisaged outcomes of H&S management and the motivational approaches of H&S regulation. Thus, a broad literature review was carried out according to the methodology of Eisenhardt (1989). The diversity of the literature increased the complexity of the research project. Only after having developed the elements of an effective HSMS (Figure 2.7) did it become clear what the interview guidance should look like.

The comparison of literature from Germany, the Netherlands and Sweden did not yield additional insights even when considering publications in the respective national languages. The described managerial and regulatory approaches were similar in all three countries, corresponding to the EU Framework Directive 89/391/EEC on Safety and Health at Work. Only the focus of the literature differed, as Swedish authors preferred formal HSMSs over the informal managerial strategies that were common in Germany and the Netherlands. At the same time, Germans focused on H&S technology, while Dutch and Swedish research considered organisational issues. Such differences reflected traditions in those countries, being the national starting points for improving H&S management and regulation within the European legal framework.

It was surprising to me that there were no meaningful statistics on occupational H&S conditions in European countries. The available data on accident rates were not suitable because definitions and recording methods varied, plus people had different perceptions depending on cultural traditions and employment conditions. Swuste (2014) presented two examples of significant statistical differences that were not caused by actual H&S conditions but rather resulted from other effects. First, in the Scottish construction industry, the rate of fatal accidents in the years 1997 to 2002 was 50% higher than in England. This was explained by differences in organisational structures, as fewer managers and experts were involved in Scottish construction projects than in similar English undertakings. Thus, the denominator of the accident rate was significantly

smaller in Scotland. Second, during the construction of the Öresund link between Denmark and Sweden in the years 1996 to 2000, the lost-time injury (LTI) rates among construction workers differed greatly. The LTI rate of Danish workers was about fourfold the rate of Swedish workers despite similar tasks and equal working conditions. Besides the better education of Swedish employees, which might indeed have affected actual H&S conditions, two social reasons were identified as explanations. Swedish workers continued working despite minor injuries because there were higher unemployment rates and less generous sickness benefits in their country. Employees' occupational attitudes affected the numerator. Thus, to my knowledge, there are no meaningful international statistics on accidents and LTI rates at fire departments.

Frick (2013b) was my starting point for developing the research question of this study. In his literature review for the Swedish H&S authority 'Arbetsmiljöverket', he stated that dedicated managers (particularly of small businesses) often did a lot to create good H&S conditions despite failing to comply with laws and regulations on HSMSs. Thus, management commitment might compensate for the lack of compliance with formal rules, and regulators might focus on campaigning for management commitment instead of enforcing rules on management systems. Thus, compliance would not be the final goal (Guldenmund, 2010). The literature review confirmed that top management determined organisational H&S conditions, but it provided few answers as to how H&S regulation affected managers' H&S activities. The initial research question focused on the relationship between regulation and managers' ways of implementing an HSMS. In order to consider different regulatory approaches, fire departments were sampled in Germany, the Netherlands and Sweden. It subsequently became clear that managers' underlying motivations were a more promising variable, resulting in the research aim to develop a typology of managers' H&S motivations. Nevertheless, the multinational approach proved to be beneficial for data analysis, as the different national contexts highlighted differences in H&S motivations and ways of implementing an HSMS. The qualitative interviews with the commanders and H&S experts in three countries reflected diverse experiences and allowed me to develop a broader picture than would have been possible within a single country.

The sampling of participants and the conducting of qualitative interviews were positive experiences. Despite a slow beginning, I found five participating fire departments in each country. As expected, the organisational ways of implementing an HSMS were

always determined by the commander or vice-commander and the H&S experts advising them. Thus, the interview guide was well received by participants because it reflected their managerial practices. The semi-structured interviews and the developed elements of an effective HSMS (Figure 2.7) resulted in open conversations about instances of HSMS implementation. The focus on concrete examples was important in identifying the actual management approaches. The benefits of the collected HSMS descriptions became evident during data analysis, especially in comparison to Schmitt-Howe (2018a). The interviews resulted in a cross-case comparison of management practices, which were qualitatively evaluated with respect to the elements of an effective HSMS. As described above in terms of countries, a quantitative comparison of organisational H&S conditions was not feasible despite similarities in operations and structures. Similarly, Reason (2016, pp. 27-28) summarised that operational figures were typically *"continuous, compelling and relatively accurate"* but that figures on H&S conditions were, unfortunately, *"sparse, intermittent, difficult and often untrue"*.

Having realised that it was impossible to quantitatively compare organisational H&S conditions with acceptable accuracy, I became aware of the challenges that H&S inspectors face. During the interviews, I asked managers about their views on the activities of H&S authorities. As Hale *et al.* (2015) had stated before, there were negative experiences with H&S authorities' operational rules in all countries. However, the national authorities' conclusions seemed to differ. Dutch and Swedish authorities were described as very active, while German authorities were almost invisible. Indeed, Schmitt-Howe (2018b) stated, as representative of the Federal Institute for Occupational Safety and Health (BauA, an agency of the German Federal Ministry of Labour and Social Affairs), that the initiative for H&S improvements should come from the companies, not the H&S authorities. In her view, top managers should implement a prevention culture because their examples had a strong impact on employees. However, my investigation of managers' H&S motivations revealed that top managers are not the starting point for developing good H&S conditions. Their decision-making is affected by the regulatory approaches of H&S authorities. During my research, I learnt that managers' most effective H&S initiatives do not result from the 'power of formal rules' but are developed as a result of 'moral and personal' motivations. H&S inspectors should promote these moral motivations by informing and convincing managers of their great influence on organisational H&S conditions.

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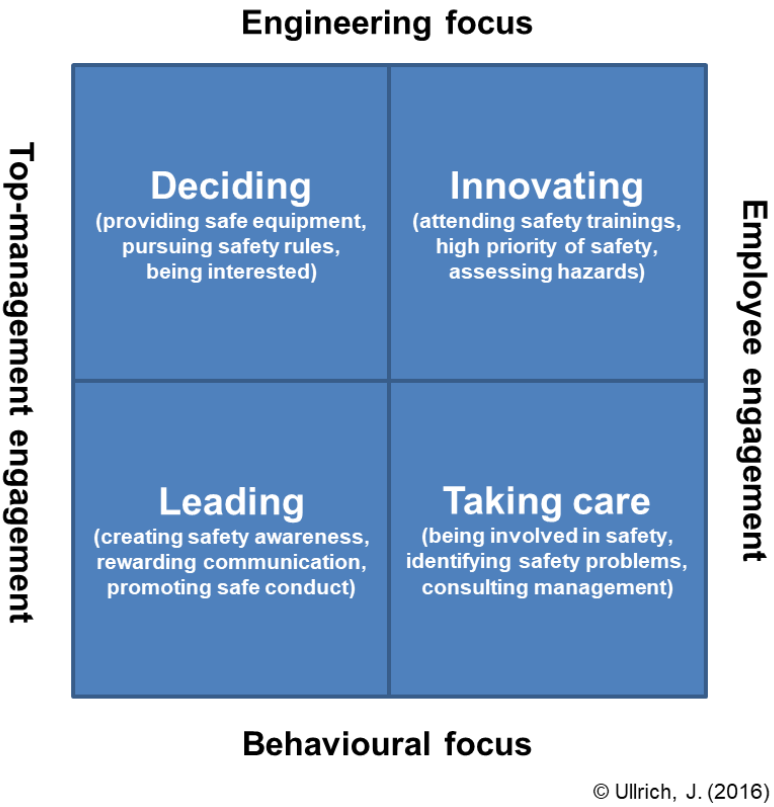
Appendix A – Initial Interview Guidance

Introduction

This research project on health and safety management at fire departments is being conducted as part of a doctoral programme (DBA) at Heriot-Watt University, Edinburgh, United Kingdom. Participants come from Germany, the Netherlands and Sweden. The objective is to better understand different national approaches to implementing common EU legislation and to facilitate international information exchange.

Two interviews of about one hour in duration are conducted at each fire department: one with the commander or vice-commander, the other with an H&S expert. Interviewees are asked if they are willing to participate and if they agree with recording the conversation. Confidentiality is guaranteed. An individual case study will be developed by analysing the interviews and the general characteristics of the fire department.

Basic model of health and safety management systems



Leading questions

1. What is the strategic focus of your H&S management system?
2. What are your reasons for choosing such an approach?
3. a) What are your experiences with the authorities?
   b) What H&S approaches and motivations have you discussed with them?

End of the interview

Interviewees are asked if they would like to add anything. They are informed that the individual case study will be used for further analysis. The management practices and experiences of German, Dutch and Swedish fire departments will be compared in order to identify similarities and differences. Each participating fire department will be provided with a summary of the results.

Appendix B – Refined Interview Guidance

Introduction

This research project on health and safety management at fire departments is being conducted as part of a doctoral programme (DBA) at Heriot-Watt University, Edinburgh, United Kingdom. Fire departments in Germany, the Netherlands and Sweden are participating. The objective is to better understand different organisational approaches to implementing common EU legislation. The practical result will be information exchange among fire departments as a basis for

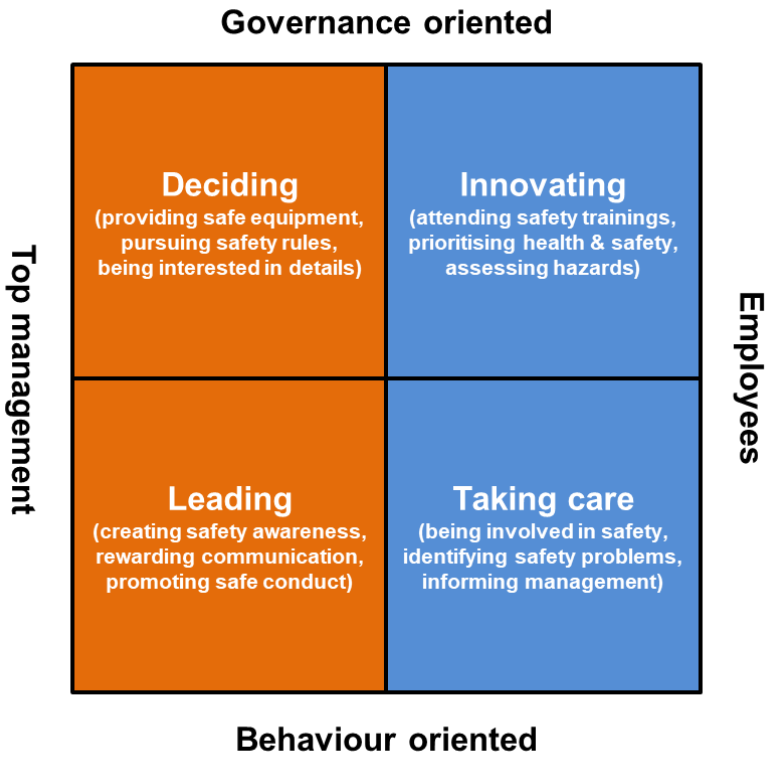
- optimising health and safety management systems at fire brigades and
- improving communication between managers and authorities.

Two interviews of about one hour in duration are conducted at each fire department: one with the commander or vice-commander, the other with an H&S expert. Interviewees are asked if they are willing to participate and if they agree with recording the conversation. Confidentiality is guaranteed. An individual case study report will be drafted by analysing the interviews and the general characteristics of the fire department, which will be provided to both interviewees for discussion.

The final case study will then be used for further analysis. The management practices and experiences of the German, Dutch and Swedish fire departments will be compared in order to identify similarities and differences. Each participating fire department will receive a summary of the results.

Basic model of health and safety management systems

Four fields of action: two for top management, two for employees:



Leading questions

1. How is your organisational H&S management system shaped?
   (discussion based on existing risk assessments and/or H&S measures)
2. What are your reasons for choosing such an approach to H&S management?
3. What are your experiences with H&S authorities (insurances, unions, etc.) and their publications?
4. What H&S approaches and motivations do H&S authorities emphasise in your view?

End of the interview

Interviewees are asked if they would like to add anything. It is repeated that there will be another opportunity for conversation (either in person or by telephone) about the draft case study report. The researcher assures that he is available in the meantime for any additional comments or questions.

Appendix C – Case Study Report NL-1
(Analytical Memo from Pilot Study)
Health and Safety (H&S) Management at the Fire Department

J. Ullrich, DBA student, Heriot-Watt University, Edinburgh, UK, ju34@hw.ac.uk, tel. +49 172 2182435

Organisational background

NL-1 is a Dutch fire department that is part of one of the 25 'veiligheidsregio's' ['safety regions'] in the Netherlands. It is a relatively large fire department with about 200 professional firefighters at five stations. The organisation has one commander and one vice-commander. The H&S expert holds a staff position but is also active as a fire officer with special functions such as hazardous materials (HAZMAT) manager and incident safety officer. NL-1 has about 20 documented risk assessments. Several of them are very similar because they cover the same topics for the administrative sub-regions of the fire department. More than five fire stations are staffed with professional firefighters. Additionally, there are more than 50 volunteer fire stations.

Approach to H&S management for considered examples

Two examples of H&S management were discussed with NL-1:

a) Draft of guidelines for 'Schoon werken bij brand' ['clean working at fire']
b) Draft of 'RI&E proces' ['process for risk assessments']

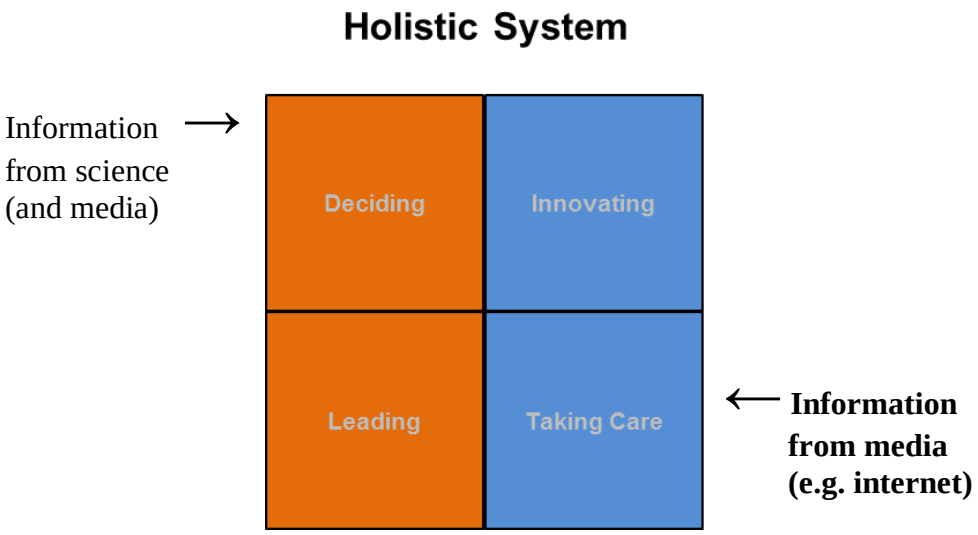
a) Draft of guidelines for 'Schoon werken bij brand' ['clean working at fire']

With regard to the model of health and safety management systems (see next page), it was determined that a 'holistic system' had formed the basis for the development of the 'Schoon werken bij brand' ['Clean working at fire'] guidelines.

This example was considered special because discussion on the topic was not limited to the NL-1 fire department or the national professional organisation 'Brandweer Nederland'. There have been comprehensive media reports in recent years about firefighters' risk of developing cancer. One of the most prominent reports was aired on the programme 'De Monitor' on 14 September 2015, entitled 'Kanker als beroepsziekte bij de Brandweer' ['cancer as an occupational desease at fire services']. The report can

be found here: https://demonitor.ncrv.nl/uitzendingen/kanker-als-beroepsziekte-bij-de-brandweer.

Model of the health and safety management system for 'Schoon werken bij brand'



In this case, a 'holistic system' was identified, although in a special version. In contrast to typical cases in H&S management, there was extensive media attention, which affected the organisation from the outside. The information from the media created strong awareness among firefighters in the Netherlands (not only at NL-1), and motivated employees to engage in 'taking care'. The 'information from media (e.g. internet)' is marked in bold in the figure in order to indicate this significant external effect. In more typical cases, the information flow into the organisation is expected to occur via the top management, that is, the commander(s) and/or the H&S expert.

Taking care was the starting point in this case. Before the media reports came out, employees of the Amsterdam fire department were at a conference in Norway and learned about studies on cancer risks in firefighting. This prompted them to begin developing their own simple measures on the work floor. Top management neither opposed nor supported the measures, but permitted them as long as the resulting costs were reasonable and within the given budget. Then the media, especially the TV programme 'De Monitor', reported on the issue. This resulted in the information spreading among firefighters nationwide. Employees at several fire departments across the country developed related measures.

Innovation took place among employees due to the widespread awareness. There was no formal training, but firefighters searched for best practices on the internet. These were implemented and tested, resulting in a practical innovation cycle in the organisations with little expert support. Thus, 'innovation' and 'taking care' were directly connected with no major involvement of top management. At a later stage, the classical innovation cycle of formal rule development in co-operation with management began. This resulted in the 'Schoon werken bij brand' ['clean working at fire'] guidelines that were discussed during the interviews at NL-1.

Deciding may be characterised as a reaction to the initiative of the employees in this case. At an early stage, small, low-cost measures (*"quick wins"*) proposed by employees were implemented. The commanders of NL-1 also implemented a task force (led by the vice-commander) in order to show that top management considered the issues to be important, too. At a later stage, the national industry association 'Brandweer Nederland' even commissioned a scientific study at the 'Instituut Fysieke Veiligheid' (IFV) [a research institute of the safety regions in the Netherlands]. In contrast to typical situations, awareness of the need to decide on new measures (and corresponding budgets) was created by the employees and the media attention. As a consequence, there was a certain degree of external pressure on top management.

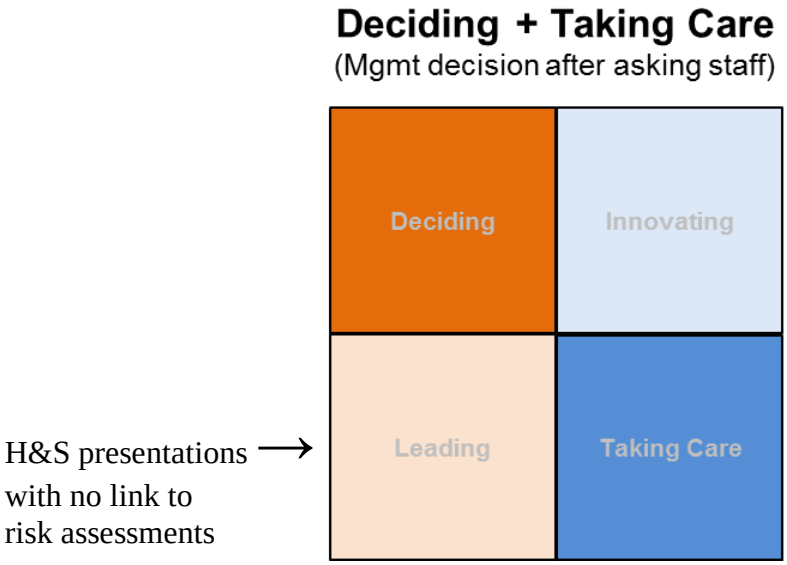
Leading in terms of creating awareness took place on a public-media level. In this context, the commander interviewed on the TV programme 'De Monitor' showed publicly that he felt strong responsibility. This helped to create awareness and a sense of urgency among other commanders and firefighters across the Netherlands. Today, it is not really necessary to create awareness among firefighters because the issue is well known and generally accepted.

Leading in terms of rewarding communication was important in getting to the point of widespread awareness. Top management did not stop employees' initial initiatives, allowing them to develop own measures. Additionally, commanders were willing to talk about the issue: at NL-1, a dedicated meeting of employees and managers was organised. Top management tried to give direction to the discussions, aiming at both ensuring management credibility and preventing employee overreactions.

b) Draft 'RI&E proces' ['process for risk assessments']

The discussed document 'RI&E proces' ['process for risk assessments'] is a draft version that was written to improve the way risk assessments are done at NL-1. The background is that many new risk assessments are needed. Several of the existing risk assessments are four to six years old. The 'Inspectie SZW' ['Inspectorate SZW', an agency of the Ministry of Social Affairs and Employment] published a report about its inspections at Dutch fire departments in June 2015 ['Inspecties bij de brandweer 2015']. They concluded that all 19 of the inspected regional fire departments did not have up-to-date risk assessments and action plans. Moreover, the authorities recommended that a more uniform nationwide approach to risk assessment and mitigation should be implemented.

Model of health and safety management system for 'RI&E proces'



Taking care of employees is part of the process for developing risk assessments at NL-1. As a starting point, firefighters are asked about their actual working conditions. For example, there are meetings to discuss scenarios such as call-outs and related actions in day-to-day operations. Additionally, H&S questionnaires are sent out to employees. Discussions between top management and team leaders (as representatives of employees) were considered to be the most valuable source of H&S information in the past. However, the size of the organisation limits the number of personal discussions that are possible; there are more than 100 team leaders. In general, however, employees take part in identifying risks.

Deciding on the part of top management addresses the risks that were identified in co-operation with employees. The associated measures are developed by top management with no significant employee involvement, taking the recommendations of the H&S expert into account and possibly also scientific findings from research institutions such as IFV [the research institute of the safety regions in the Netherlands]. The defined measures are then communicated to employees through presentations by commanding officers and/or the H&S expert.

Leading is less relevant in this case. There are training courses and presentations about the H&S risks and measures for firefighters. Major topics and the H&S strategy are presented to the team leaders in an annual top management presentation. However, these presentations are typically not about topics that are mentioned in the risk assessments (RI&E) because these documents are very comprehensive and detailed. Thus, the contents of the risk assessments are weakly related to practices on the work floor; they may be considered rather theoretical.

Innovating is less relevant here, as well. The measures resulting from the risk assessment are defined by top management, taking the advice of the H&S expert into account. Only a few of them are communicated in the training courses and presentations, as their relevance to the day-to-day work of firefighters is limited. As a result, innovation processes are hardly possible due to the missing link between documented rules and practical experiences. Nevertheless, NL-1 has introduced organisational innovations in the past, such as designated H&S fire officers in the field at major incidents.

Main motivations for choosing the approaches

a) Developing guidelines for 'Schoon werken bij brand' ['clean working at fire']
This was a special process that was initiated by employees with the help of the media. From a scientific perspective, it was not even certain whether cancer was the most relevant H&S issue (high temperatures might be more relevant). Top managers were, to some extent, forced to respond to public and staff opinion. The 'holistic system' resulted from staff awareness and management support for open communication. Commanders then decided on further H&S initiatives for cancer prevention with respect

to the emerged information and small-scale H&S measures of employees. They wanted to start doing something even without having any proof of the cancer risks. At the same time, they tried to give direction to the discussion, aiming at both ensuring management credibility and preventing employee overreactions.

b) Draft 'RI&E proces' ['process for risk assessments']

This process reflected the formal process that was legally required in the Netherlands. However, it was acknowledged that few new practical insights would result from such regular risk assessments: it is estimated that about 80% of the findings from 2011 are still valid today. Therefore, NL-1 is attempting to make the process for risk assessments more dynamic. They want to make it less formal, and to make it easier to change the content. At the same time, they want to retain control of the process and its contents. This would ensure that the new 'RI&E proces' ['process for risk assessments'] meets legal requirements and also supports the development of H&S measures.

Experiences with H&S authorities and views on their priorities

Inspectors of the 'Inspectie SZW' tend to visit the fire department about once every three years. There may be smaller inspections in between these main inspections. Inspectors want to see documents (especially valid risk assessments and action plans), but they also talk to people on the work floor. In a comprehensive inspection, the authority will investigate both the H&S conditions on the work floor (for example, equipment at the stations and current behaviours) and the strategic H&S management system (for example, H&S policy and reporting system for near misses). NL-1 has also discussed H&S innovation processes and experiences with authorities. Thus, the authorities' approach represents a 'holistic system' in terms of the model shown above. In general, they are open to discussion.

The 'Inspectie SZW' takes a rather national view on fire departments and their H&S management. Thus, they recommend a more uniform nationwide approach to risk assessments and H&S measures; see the SZW report on its inspections at Dutch fire departments in June 2015 ['Inspecties bij de brandweer 2015'].

Ideas of the researcher on the approaches to H&S management

In the ‘holistic system’ described above, top managers led the way by allowing and supporting the corresponding communication. However, they partly lost control over the contents of the discussion, which were defined by employees based on media reports. This is a general risk when open communication is encouraged, because it produces H&S information that management must consider and appreciate. If management ignores the resulting H&S information, the ‘taking care’ of employees will decline.

The ‘RI&E process’ [‘process for risk assessments’] might be improved by making the contents more relevant for daily practice. In addition to simplified processes, the following ideas may increase the effectiveness:

- Split the risk assessment documents (‘RI&E’) into smaller pieces. Many small risk assessments should be more likely to remain valid because they are easier to amend. Such simplified documents are easier to use in innovation processes with employees.
- The action fields of ‘leading’ and ‘innovating’ might be initiated with workshops on specific H&S issues that are relevant for daily work – perhaps including near misses. Management would no longer decide alone on H&S measures. This would result in a ‘holistic system’ also for the ‘RI&E process’ [‘process for risk assessments’].

Idea from NL-1 regarding the model

In the field ‘innovating’, it might be more appropriate to state *“assessment of measures”* instead of *“assessment of hazards”*. For example, in the case of the risk for cancer, the severity of hazards within a fire department cannot be assessed by employees, but it can be evaluated whether a certain measure is practicable and likely to be effective.

Data sources for this case study

This case study is based on two interviews and a site visit, which were conducted in April 2017. The first interview participant was the H&S expert; the interview duration was 71 minutes. The second interview participant was the vice-commander; the interview duration was 48 minutes. Also considered were the two written documents 'Schoon werken bij brand' ['clean working at fire'] and 'RI&E proces' ['process for risk assessments'], which were developed by the organisation. Additionally, the inspection report of SZW 'Inspecties bij de brandweer 2015' of June 2015 was taken into account.

Appendix D – Transcript Excerpts from Pilot Study Interviews

Codified text passages

- Blue: statements on managers' H&S motivations
- Yellow: descriptions of organisational context (project contexts in these cases)

First pilot study: transcript excerpt from interview with vice-commander NL-1

I: That's basically the model. The literature says all four fields should take place somehow and the reality says, also my experience but also what I heard at other fire departments, is it's not easy to really do that. #00:06:26.0#

R: No, it's not easy. #00:06:28.3#

I: Typically, you're focused on some parts of it and the idea was to discuss today about these two examples your fire department presented, what you think, how it worked. First, perhaps 'schoon werken bij brand' ['clean working at fire'] and the second is the new risk assessment procedure, the 'RI&E' procedure ['process for risk assessments']. Should we start with the first then, 'schoon werken bij brand'. What was your experience in that project or this development? I think it's been in development since 2015, isn't it? #00:07:08.9#

R: Yes, correct. Because of the same reasons why firemen, the basis of our organisation, start worrying about their health according to cancer, according to smoke, according to all the stuff that comes out of a fire, it was the same time when we got the awareness as well that maybe we have to do something. That's the time when we decided to start up a task force. We, as the top management of the organisation, find it very important. We said, well, the deputy commander is leading the task force just to make an example that we also find it very important. #00:08:11.9#

I: Okay, so you were head of the task force, and there was… basically you also found it important as a response to the importance of the employees? #00:08:21.6#

R: Yes. The awareness came on both sides as well as the employees, as well as the top management. We then decided to create the task force and within the task force, we talked about measures; what can we do in the short term, what can we do in the mid-term, and what do we have to do in the long term. We said, okay, because people [at the work floor] were worrying about it, we have to do some… we call it low hanging fruits, the quick wins. We have to do something to show that we really care, that we really want to invest. You probably discussed the measures we do with [name of H&S expert], for instance, the cleaning, extra suits, cleaning rooms in all the fire stations. We went to the board, the boss of our organisation… #00:09:55.2#

I: In a company, it would be supervisory board? #00:09:58.5#

R: No, the commissioners, the board of commissioners [municipal representatives]. We said, "Well, this is what we think is important. These are the risks that we have in our organisation and because of our work, this is what we want to do and this is what it's going to cost. Do you agree? Do you want to spend more money on that? Do you want to pay more for it?" and they said, "Yes, this is important and that is our role". So, one way is into the organisation and the other way is through our board of commissioners to say, "This is what we want, this is what we need but this is what it's going to cost you". #00:10:44.0#

I: Do you agree, yes. It helped probably the commissioners that there was also a TV program? I mean, I saw it on the internet, on 'De Monitor' [news magazine in Dutch TV], … I assume everybody knows it here. #00:11:02.0#

R: Yes, everybody knows but there's also not a… Sometimes people overreact and that's the other part of it; how do we avoid panic. #00:11:19.6#

I: Yes… Panic is perhaps too much but, yes. #00:11:23.2#

R: Over-concern. #00:11:23.9#

I: Over-concern, yes, that the people are scared to do their work. #00:11:27.4#

R: Fear to do their work. So, we have to bring back reason in what we have to do and that's what the measures are, especially the short, the quick wins, what do we do. Will this work? We don't know. It was not a decision we made. We don't know if everything works but we start and then we listen to… and this is what you said about innovating. We have an idea that's going to work. We start and when it's not working or when it has to be done another way, we will accept that and we change the way we do it. We change the way we clean things, etc. #00:12:26.2#

I: I mean you said it's a reaction, or you show your initiative. Now, I have talked to one colleague in Germany and they are very much coming from this analytical part and saying, "Well, we have no scientific proof yet that there's a danger. Of course, we are aware and we think of it", but they have less measures. #00:12:52.9#

R: I know but, on the other hand, that was what we really believe, the colleague in Germany is right. There is no scientific proof but I don't want to be involved in 10 years when I could have done something now which I haven't done because there was no scientific proof. #00:13:23.2#

I: Understood, yes. #00:13:24.6#

R: I'm not sure it's working, what we do but it sure doesn't harm. #00:13:34.2#

I: Yes, true. #00:13:34.8#

R: It's not a bad thing to take off your dirty clothes and put on some new ones. #00:13:44.6#

I: It cannot harm. #00:13:46.3#

R: There's no harm. I don't know if it really helps. That's the other thing we're going to do, I can only tell that over maybe two decades but should I take the risk now to do nothing. That's when we said no. #00:14:07.8#

I: Okay. #00:14:09.3#

R: But we do it reasonably within proportions. We don't overreact but we're going to do something. One of the other things we're doing is, okay, this is the short term, this is what we're going to do. [name of H&S expert] has told you probably all about it. We are innovating. #00:14:29.8#

I: You went into more details, yes, and therefore it's a study at IFV ['Instituut Fysieke Veiligheid', a research institute of the safety regions in the Netherlands]… right… about the cleaning. #00:14:40.4#

R: For instance, the suits stay where they are, the clothes, the specific fire clothes. We have to change them this year or next year. We said we'll wait because we know there's a study going on in Finland. When the results of the study come in then we decide what route we're going to go. That's one of the decisions we made. #00:15:15.1#

I: Also, that's not a costly decision. It doesn't cost very much extra. It's cost nothing, basically, and you simply wait. #00:15:23.2#

R: On the other hand, when things cost, for instance, every professional fireman here has a second suit. #00:15:33.2#

I: Yes, and that costs. #00:15:34.3#

R: That costs, but that's necessary because we want to achieve things. We want to achieve that everyone doesn't have to use a dirty suit on the next incident. If you say that, you have to accept the costs. #00:15:57.6#

I: Yes, but that's then really a discussion of cost because that's a lot of cost. I mean a second suit, that's a substantial cost. #00:16:02.7#

R: That's a substantial cost but, on the other hand, when you set out a line, "That's what we want to be, that's what we want to do", you have to accept the consequences. Of course, there are limits, sure, but on the other hand when you say we are an organisation that goes for safety and for health – that's what we do outside – then we also have to do that for our own employees. #00:16:37.8#

I: Yes, you need it otherwise you'll lose your credibility. Okay, and then of course the leaders, I'm just thinking about leading, it's not creating awareness because the awareness was there anyway, right? It's more like rewarding communication then? #00:16:57.3#

R: Yes, it's rewarding communication and it's canalizing. How do you call that, to lead the awareness? #00:17:11.0#

I: Yes, "Kanalisieren" in German. I have to write it down. I don't know how to say it in English, to give direction. #00:17:24.2#

R: To give direction to the emotions, to the awareness, that's what we do by leading. #00:17:30.3#

I: Yes. I think we mean the same.

R: "Kanalisieren" is what we would say in Dutch, too.

I: I have to look up what that really means in English. #00:17:50.0#

Second pilot study: transcript excerpt from interview with vice-commander D-1

R: I'll give one more example. With regards to accidents, I don't know whether you've heard, now we're at smoke diving [accidents]: in Marne and in Cologne.

I: I know Cologne, yes. #00:41:50.9#

R: There were smoke diving accidents there. And we also looked at the accident reports during this working group and honestly asked ourselves, can that happen with us, something like that? And what was the/ there were actually really complex causal chains, that each led to the accidents. In Marne unfortunately fatal, in Cologne thank God yes only seriously injured. Can components of this causal chain also occur with us? And we realized, yes, they can happen. How do we actually do our pressure

monitoring, if we do the pressure monitoring? And then they said, yes, the lowest pressure, that and that. And then we said, yes, guys, that's dangerous, because if the pressure, if one person is being deployed with 330 bar and the other one with 270 bar. Then I automatically assume that the lowest pressure is coming from the one who has the 270 bar. But what if the other one has a device defect and suddenly after the second pressure monitoring it's the low/then I don't see that. So we need to perform a pressure monitoring. So… That was the first realization. And then it can happen to us that one time someone whose breathing protection is not monitored is deployed in smoke diving. Rather rare but it can happen. #00:43:08.5#

I: Who isn't capable of smoke diving? #00:43:10.5#

R: No, he is capable of smoke diving, but he hasn't registered. And then we thought, how do we come to the point where we can see from a distance, if he was at smoke-diving registration or not? And yes, then we thought, okay where is there a system where you have to remove something, so that something can start. And then there is this remove before flight trailer at Lufthansa or for some airlines, before the aircraft can fly again. And then we said that we could, actually…, we make a remove-before-smoke-diving badge, which is fitted with velcro to the jacket. We have bright jackets and then I can see from far away, because someone has a smoke diving device and may already be connected but still has this badge. This can't happen. And at the same time, each person individually gets his name written on it, so that when I am at the smoke diving registration, I don't have to write on it, or what was the name of that guy that just went past because the machinist [driver of the fire engine] at the beginning, if he has to do the smoke diving registration/has several tasks and can't do all of that. And this is now an example where, in our existing structures without a technical… well, yes, that is also technically a change, but where, in existing structures, we've learned lessons, yes from others, said to ourselves when reading accident reports of others, we need to improve that. #00:44:40.2#

I: And that's a velcro strap on each person's jacket. #00:44:45.1#

R: Exactly, we have jackets that are sand bag colours and so you can see the red very easily. And so, also a bit with a smiley, there's this remove-before-smoke-diving, everyone knows the remove-before-flight and yes. #00:45:00.4#

I: This is a great idea, yes. #00:45:03.5#

R: Then we wrote a product introduction for it. Exactly so. It explains, what's the background? Why do we want it like that? We have procured other smoke diving registration badges, but this is pure coincidence. And then [at that point in time] we also asked the team what other problems does smoke diving registration create for us. If, for example, it rains, then, sorry, the pen doesn't write. How do we get the pen to write? Then we looked for paper that is not destructible, on which you can write under water, and got a pen, the famous NASA pen. I don't know if you know the one which has a gas pressure system and always writes. No matter whether I write over my head, underwater, whatever. It's called NASA pen, because NASA/ #00:45:51.5#

I: … it's for microgravity... #00:45:54.5#

R: Exactly. The Russians just took a pencil, but we couldn't do that now because it doesn't write so well if it's wet. But that's how things came about from it... Just to make it easier because people may die from that. We have seen that in a practical example. Unfortunately, it was a dramatic way but said it made us decide, that's how we'll do it. #00:46:18.0#

I: And, once again, that was also from a working group [in the federal state of D-1], wasn't it? #00:46:20.9#

R: No, it is a D-1 idea. #00:46:22.5#

I: This is a D-1 idea? #00:46:23.8#

R: D-1 idea. #00:46:27.4#

I: Yes, the other… we will later… exactly. #00:46:28.9#

R: But we found the idea, now it shouldn't sound like we're blowing our own trumpets, we found the idea to be a good one and used an event in the district of [name of the administrative region] where we informed people about it. That was our idea. We said,

listen people, there were two serious smoke diving accidents. We've examined them. We'll describe the accidents to you. And at the same time, we'll describe the lessons we learned from them to you. And then we offered a training session, it was really well attended, there were 112 colleagues, comrades, managers from the entire district area and at the same time we also wrote an article for an association newsletter [in the federal state of D-1], where that was then publicised, the idea behind it. #00:47:07.1#

I: Ok, nice. This means that you have developed the measure in a work group. Who was included in this working group, then? #00:47:13.9#

R: The idea was from this AusTakTek. [Commission for] technology and tactics… and me also. Yes. #00:47:20.1#

I: So, from this working group, yes, from you as the leader and the others, those are? #00:47:27.7#

R: Colleagues. Section heads. Managers. #00:47:30.4#

(Short interruption because of incoming telephone call)

I: You talked about the decision-making circle according to the fire department rule FwDV 100. Well, that [rule] is rather abstract. For example, what I have seen in Sweden is that in addition to these abstract instructions, they also try to make detailed instructions, for instance, the smoke is dense, then you do that. The smoke is less dense, then do you do this. So just for the smoke diving activity. What they, yes, what's defined as policy there, is there also something like that here, or is that/ #00:48:23.8#

R: So, we have the so-called standard operating rules for emergency responses. They aren't that detailed, but instead we have trainings, we train our colleagues for 18 months in firefighting and give them regular ongoing training. We send them once into the fire container, where they're supposed to learn how to read fire and I have no possibility to work according to a checklist – so to say, inside [a building] – like a pilot, who can simply take his checklist into the cockpit and say, that's happened, I can't do that in

smoke diving. Because either I must hold the checklist as close to my face as possible or I can/ #00:49:02.8#

I: You can't see it, exactly. #00:49:04.5#

R: I can't see it at all, exactly. This is why we are trying to get measures through right now, that keep everything as simple as possible. And with good training and regular repetition of the training, giving people the right tools in their hand, but also encouraging the people very clearly in their responsibility. Taking responsibility. Making decisions themselves. To say, okay, we'll do this like that now and we'll do this like that now. And me personally, however this is my totally personal opinion, I don't think it's effective if I say to someone, the smoke is thick or the smoke is this, and now you must do that and that by default, because each indoor intervention, each work is very individual there and we want them to deal with their environment and we train them so that they can develop a sense of the situation exactly for this reason. And the answer but not always by default, but also in relation to the concrete situation for yourself and your team partner, is to develop a strategy for action that allows you to proceed. That's why it's our task to give them tools in their hand but also to train them to take a certain degree of responsibility. #00:50:20.3#

I: Self-responsibility also means, of course/ #00:50:22.8#

R: making decisions. In a small area, but then we enable them to make decisions. #00:50:29.1#

I: That means that they then also have, you also allow them to make the decision. #00:50:33.9#

R: Yes, of course. #00:50:34.6#

I: So, you require it of them. #00:50:36.1#

R: This is what we do in ambulance service as well… (deviating from the topic of indoor firefighting)… I must be aware of the good training and say, yes, they have the right tool to make the decision. #00:53:16.3#

I: This is also… exactly… If we come back once again to this smoke diving team member. He must also, if he feels uncertain inside there, now from my perspective, then he obviously doesn't need to read any operating instruction, he just has to, then he has to practically be able to give the message and withdraw. #00:53:32.8#

R: Exactly. In principle, he [the fireman] must evaluate, can I take responsibility for taking a measure now, which maybe isn't the standard measure but can remedy things here. If I can't, I must pull back and provide feedback. The decisive factor is that they communicate, that this feedback comes and the decision, right now I'm at my wits end here and then also give the feedback. To do this, technically the options must exist, the best possible ones. And the employees must be sensitized to realise: So, now I'm at my wits end and I need support in making a decision. #00:54:13.9#

I: Yes, and he must and perhaps he must also have the feeling that he is allowed to say it. #00:54:19.3#

R: Precisely, yes. #00:54:21.3#

I: So you can also create a lot of pressure. #00:54:26.9#

R: No, so we try to live it like that, that the employees have no inhibitions, even for something like this to get down to the details, say, hey, what did you think when this happened? What was going on? What is the background? This is what works in practice. And then we must consider the matter. Because they don't want to tell us anything personal, but we should, it’s in our interest for them to be able to work as best as possible, because they can put out the fire that way as best as possible or help someone in the rescue services. It's our task to create the best possible framework, the best possible way to do that. And if you come up against the limits at any time and actually want more then you must be able to report that back and constructively that's always the most decisive thing, that's exactly why we have this requirement, this requirement that there is constructive feedback, can you do that or consider it once again, improve. #00:55:18.5#

I: A question then: Employees, now if I'm one of your employees, you said several times, good, then on the one hand I can come into your office, and say, this and that is bothering me. Are there any other ways I can give feedback? #00:55:32.3#

R: Yes. We have a regular meeting, which is called a jour fixe. Jour fixe rescue service, now this is my area. All the employees can attend this. The focus, of course, is from the field of rescue services. But everyone else who wants to come is invited or gladly invited to come and they can say anything there. And there we've already discussed garbage bags in garbage bins. There are minutes. The minutes state what the content was. Who has a task and who is responsible and by when. And that's been going on since I've been here, for two and a half years. And since then, there are minutes once a month, where that was held, what was discussed. #00:56:17.4#

Appendix E – Interviewees' Motivation Statements

Interviewee	Motivation statement
D-2 Interview commander	draw information from the circle of professional fire departments
D-2 Interview commander	employees came and said
D-2 Interview commander	I did not choose the H&S approach, but it has been historically developed
D-2 Interview commander	it was always done like that
D-2 Interview commander	derived from legal demands there is a focus on machines and technical installations
D-2 Interview commander	governance of top-management, this I want to improve
D-2 Interview commander	lack the H&S committee. It is at the city
D-2 Interview commander	I am interested that the employees do not suffer any harm
D-2 Interview commander	improvement of the system
D-2 Interview commander	specifications of district government
D-2 Interview commander	this fire department is lacking a good middle management
D-2 Interview commander	more time for their duties, one or the other could be trained even better
D-2 Interview commander	strengthening H&S as it will be on team leader level and in the tactical department
D-2 Interview commander	tactics determines purchasing, not vice versa
D-2 Interview H&S expert	because we have no time for another version than the top-down approach
D-2 Interview H&S expert	completing regular inspections, in principle according to the H&S law
D-2 Interview H&S expert	controlling of day-to-day business
D-2 Interview H&S expert	first checking the available data on a topic
D-2 Interview H&S expert	it must be ensured that the quality of our work is not reduced by improved H&S
D-2 Interview H&S expert	not very much time, thus we pursue with a short analysis

Interviewee	Motivation statement
D-2 Interview H&S expert	transport this mentality in such (dangerous) fields
D-2 Interview H&S expert	you see the result, but the way we came there is not shown
D-3 Interview commander	(H&S Expert of the city) came here and asked for risk assessments
D-3 Interview commander	the head of the diving team came to me
D-3 Interview commander	when he (the H&S Expert of the city) offered his support
D-3 Interview commander	I do not have the time (to complete all risk assessments)
D-3 Interview commander	everyone has always said that it is enough to
D-3 Interview commander	if I am not able to change the H&S related building situation
D-3 Interview commander	I have very clear requirements from my mayor
D-3 Interview commander	It is fun to discuss with (the H&S Expert of the city)
D-3 Interview commander	two (free) master students searched for a dissertation topic
D-3 Interview commander	we think through the (H&S) work procedures
D-3 Interview H&S experts	according to the rule 'DGUV A1' the delegation of responsibilities shall now
D-3 Interview H&S experts	(peers) have asked, do you have a risk assessment diving
D-3 Interview H&S experts	create patience at the emergency site
D-3 Interview H&S experts	making the responsibility clearer for all
D-3 Interview H&S experts	if we have a higher education, the (work) quality will be better
D-3 Interview H&S experts	one of the most dangerous activities
D-3 Interview H&S experts	procedures being practical so that they can serve superiors
D-3 Interview H&S experts	we must act according to the rules
D-4 Interview H&S expert	and then the top-management feels to be obliged

Interviewee	Motivation statement
D-4 Interview H&S expert	it is less about the rules and laws, but more often the inspiration from younger colleagues
D-4 Interview H&S expert	there are fields, and that concerns of course H&S, where inspirations can be important
D-4 Interview H&S expert	when a (vacant) position is filled, something changes too
D-4 Interview H&S expert	every fireman is a little bit of a hero
D-4 Interview H&S expert	I used the opportunity
D-4 Interview H&S expert	one has no other choice than to comply
D-4 Interview H&S expert	there are of course laws
D-4 Interview H&S expert	we do not only want to comply with the law
D-4 Interview H&S expert	you are even responsible for their actions if you are not with them
D-4 Interview vice-commander	(allowing wishes) we get relatively many ideas also from employees
D-4 Interview vice-commander	could not imagine how we could make it better with the given resources
D-4 Interview vice-commander	my duty to set priorities (in the budget)
D-4 Interview vice-commander	it is difficult to describe (a risk assessment)
D-4 Interview vice-commander	that are all things which develop from experience
D-4 Interview vice-commander	train things so that it works at the emergency
D-4 Interview vice-commander	we have now a relatively good solution
D-5 Interview H&S expert	because of less emergencies, one must complete more trainings
D-5 Interview H&S expert	analyse how it looks like in the cabin (of the fire engines)
D-5 Interview H&S expert	every fire department must be financeable
D-5 Interview H&S expert	I have no time
D-5 Interview H&S expert	during emergencies... would not be possible
D-5 Interview H&S expert	health and safety works well for reaching decisions

Interviewee	Motivation statement
D-5 Interview H&S expert	health and safety is allowed to also use
D-5 Interview H&S expert	in the building now everything ok, thus my main duty
D-5 Interview H&S expert	one lives as a team
D-5 Interview H&S expert	regarding safety, we rather rely on the manufacturer (of the vehicle)
D-5 Interview H&S expert	the latest knowledge
D-5 Interview H&S expert	we have a reporting system, which however was not made for H&S
D-5 Interview vice-commander	a little bit of individual responsibility (of the fireman)
D-5 Interview vice-commander	do not aim for total safety, then we would not well extinguish the fire
D-5 Interview vice-commander	everyone (fireman) can decide himself
D-5 Interview vice-commander	I (must) provide the tools that one needs
D-5 Interview vice-commander	our safety rule also says that we can deviate from certain things
D-5 Interview vice-commander	it must be solved technically
D-5 Interview vice-commander	manufacturers… develop things
D-5 Interview vice-commander	there are also safety rules
D-5 Interview vice-commander	there is a danger (in the risk assessment), so I must react
D-5 Interview vice-commander	there are things that cannot be prescribed in detail
D-5 Interview vice-commander	there currently is a mindshift, everybody has realised
D-5 Interview vice-commander	within the large fire department community of AGBF one then said
NL-2 Interview commander	big responsibility for the user themselves
NL-2 Interview commander	let people have a big influence
NL-2 Interview commander	let's try to make our own instruction movie

Interviewee	Motivation statement
NL-2 Interview commander	that is a cultural thing
NL-2 Interview commander	work in the NL-2 way
NL-2 Interview H&S experts	creating awareness
NL-2 Interview H&S experts	give a good example
NL-2 Interview H&S experts	policy in our region is, everyone is responsible
NL-2 Interview H&S experts	learn from near misses
NL-2 Interview H&S experts	the fewer layers of managers, the better it is (according to or policy)
NL-2 Interview H&S experts	we are all responsible for our health
NL-3 Interview commander	everything is made a safety issue
NL-3 Interview commander	dealing with it together (with the union)
NL-3 Interview commander	did not feel free to do so
NL-3 Interview commander	investigation in the first place
NL-3 Interview commander	needed an accident to mind shift
NL-3 Interview commander	not the right way (according to experience)
NL-3 Interview commander	think more about how we do it
NL-3 Interview commander	the whole system
NL-3 Interview H&S expert	people decide
NL-3 Interview H&S expert	know what risks you take
NL-3 Interview H&S expert	prevention
NL-3 Interview H&S expert	team support (‘draagvlak’)
NL-3 Interview H&S expert	people are not always convinced
NL-3 Interview H&S expert	prevent that risks are brought in

Interviewee	Motivation statement
NL-3 Interview H&S expert	that communication works well
NL-3 Interview H&S expert	there might be an H&S problem
NL-4 Interview commander	before we were very busy making the list right so the inspection could not say nothing
NL-4 Interview commander	believe very in the behaviour-oriented thing
NL-4 Interview commander	improve the health and safety situation and documentation
NL-4 Interview commander	explain why it is a problem
NL-4 Interview commander	it is to the manager to get it better
NL-4 Interview commander	how to manage behaviour
NL-4 Interview commander	making people think
NL-4 Interview commander	fire departments are experienced-based for how they learn
NL-4 Interview commander	it is important, but the second step is
NL-4 Interview commander	so that also people are knowing why we do the things
NL-4 Interview commander	only the technical option is not enough
NL-4 Interview commander	really make it happen
NL-4 Interview H&S expert	people said ... there is a problem
NL-4 Interview H&S expert	need extra money
NL-4 Interview H&S expert	learn the people first think, first look, be aware
NL-4 Interview H&S expert	newer insights
NL-4 Interview H&S expert	we have to educate our personnel
NL-4 Interview H&S expert	there was not enough awareness
NL-5 Interview H&S experts	competition atmosphere
NL-5 Interview H&S experts	being responsible

Interviewee	Motivation statement
NL-5 Interview H&S experts	convince people in order to organise it
NL-5 Interview H&S experts	create understanding
NL-5 Interview H&S experts	it is not top-down
NL-5 Interview H&S experts	management has decided on H&S policy
NL-5 Interview H&S experts	new organisation
NL-5 Interview H&S experts	putting a name to it
NL-5 Interview H&S experts	make people think about it
NL-5 Interview H&S experts	the higher our target the more money it will cost
NL-5 Interview H&S experts	something new
NL-5 Interview H&S experts	we meet the law
NL-5 Interview H&S experts	to convince people
NL-5 Interview H&S experts	want to accomplish something
NL-5 Interview vice-commander	(explain) what we do and why we do it
NL-5 Interview vice-commander	communication with the members of the organisation
NL-5 Interview vice-commander	people must experience that something changes for them
NL-5 Interview vice-commander	health and safety team independent of primary processes
NL-5 Interview vice-commander	in the media there was much coverage
NL-5 Interview vice-commander	mayors come by themselves with these questions
NL-5 Interview vice-commander	taking health and safety problems of staff serious
NL-5 Interview vice-commander	one can do much good with it
NL-5 Interview vice-commander	with it there is an (H&S) face in the organisation
S-2 Interview commander	agreements between the employer and the employee

Interviewee	Motivation statement
S-2 Interview commander	it was sponsored by the insurance
S-2 Interview commander	I (as fireman) have the responsibility to wear the things
S-2 Interview commander	in S2... we work like this
S-2 Interview commander	putting people to work with it
S-2 Interview commander	we are turning into more personal responsibility
S-2 Interview commander	you need to fulfil them (the legal rules)
S-2 Interview H&S expert	better to have good material for education, and then maybe instructions
S-2 Interview H&S expert	(using time) between emergencies
S-2 Interview H&S expert	it does not cost us much (the time between emergencies)
S-2 Interview H&S expert	it is enough safe for us
S-2 Interview H&S expert	learn them how to express the risks
S-2 Interview H&S expert	exchanging ideas with other fire departments
S-2 Interview H&S expert	saw ways of doing better
S-2 Interview H&S expert	we know that they (the H&S authority) are going to ask
S-2 Interview H&S expert	that was wrong in the system
S-2 Interview H&S expert	you should feel well when you are on the job
S-2 Interview H&S expert	we are interested and we learn things that we can really use and change
S-3 Interview H&S expert	because it is in the law
S-3 Interview H&S expert	convince the employees and the employer
S-3 Interview H&S expert	educate the employees
S-3 Interview H&S expert	get lot of answers by doing this
S-3 Interview H&S expert	have a bigger knowledge

Interviewee	Motivation statement
S-3 Interview H&S expert	have a harder safety instruction than the manufacturer
S-3 Interview H&S expert	they (the people) did not complain
S-3 Interview H&S expert	you minimize the costs or you minimize the risk to employees
S-3 Interview vice-commander	is quite new for us also, so that is why it was important
S-3 Interview vice-commander	just take really care of the H&S question
S-3 Interview vice-commander	make sure that the questions about safety (are considered)
S-3 Interview vice-commander	sometimes it is a money question also
S-3 Interview vice-commander	that idea came up together with the people
S-3 Interview vice-commander	we are more on practical things and maybe not make a special paper
S-4 Interview H&S expert	(decide) how it should be done
S-4 Interview H&S expert	in law it is, sort of, written down
S-4 Interview H&S expert	it is his (the vice-commanders) decision but i think it gives the possibility for the people
S-4 Interview H&S expert	supposed to check them every year
S-4 Interview H&S expert	processing things
S-4 Interview H&S expert	take care of all the things
S-4 Interview vice-commander	do it systematically
S-4 Interview vice-commander	first have to see in the legislation
S-4 Interview vice-commander	evaluate incidents
S-4 Interview vice-commander	learn from our
S-4 Interview vice-commander	make new education material
S-4 Interview vice-commander	then we have it done (according to the law)
S-4 Interview vice-commander	pick up how to continue

Interviewee	Motivation statement
S-4 Interview vice-commander	problem is the learning phase
S-4 Interview vice-commander	wanted to change the roles and how we work
S-4 Interview vice-commander	tried to find a solution
S-4 Interview vice-commander	wanted to see, okay, can we learn something from that
S-5 Interview H&S expert	brainstorm it together
S-5 Interview H&S expert	clarify for the team leaders
S-5 Interview H&S expert	if we don't report near misses, the third time it will
S-5 Interview H&S expert	if you take a risk it should be really calculated
S-5 Interview H&S expert	information that we will give to all the people
S-5 Interview H&S expert	try to protect
S-5 Interview H&S expert	we have to comply with it
S-5 Interview H&S expert	try to get everyone's opinion
S-5 Interview commander	a tool when we do something (organisational)
S-5 Interview commander	being responsive, listening to employees
S-5 Interview commander	create feeling of confidence and safety (‘trygghet’)
S-5 Interview commander	focus on certain things
S-5 Interview commander	find solutions
S-5 Interview commander	go through what can occur
S-5 Interview commander	municipality's way of controlling
S-5 Interview commander	it must be easy for those who take responsibility at the site
S-5 Interview commander	learn from accidents
S-5 Interview commander	progress with rules

Interviewee	Motivation statement
S-5 Interview commander	risk assessment is a good tool
S-5 Interview commander	they want that we do an update every year
S-5 Interview commander	systematic way of preventing
S-5 Interview commander	a fireman can always say no